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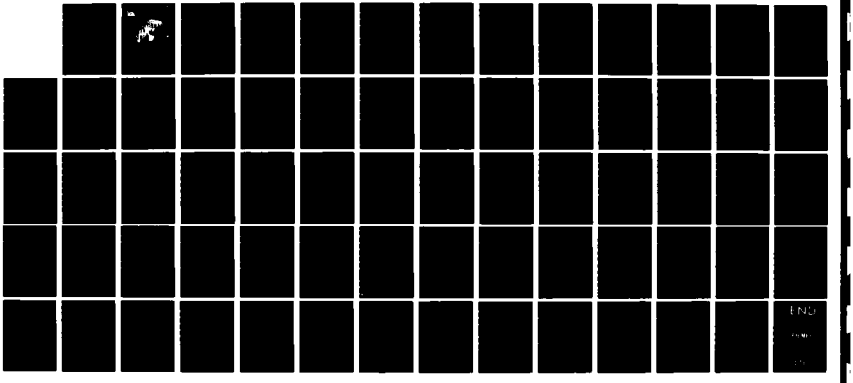

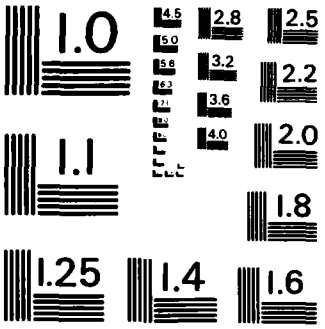

UNITED STATES AIR FORCE

# OCCUPATIONAL SURVEY REPORT

AD-A158 602

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METALS PROCESSING CAREER LADDER

AFSC 427X4

AFPT 90-427-547

AUGUST 1985



OCCUPATIONAL ANALYSIS PROGRAM
USAF OCCUPATIONAL MEASUREMENT CENTER
AIR TRAINING COMMAND
RANDOLPH AFB, TEXAS 78150

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| NODAC | 1 | | | |
| 3330 TCHTW/TTGX (CHANUTE AFB IL) | 5 | 2 | 9 | 2 |
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## PREFACE

This report presents the results of a detailed Air Force Occupational Survey of the Metals Processing career ladder (AFS 427X4). The project was directed by USAF Program Technical Training, Volume Two, dated June 1983. Authority for conducting occupational surveys is contained in AFR 35-2. Computer products upon which this report is based are available for use by operations and training officials.

The survey instrument was developed by Mrs Viola Allen, Inventory Development Specialist, with computer programming support furnished by Mrs Rebecca Hernandez. Mr Robert L. Alton, Occupational Analyst, analyzed the survey data and wrote the final report. This report has been reviewed and approved for release by Lieutenant Colonel Charles D. Gorman, Chief, Airman Career Ladders Analysis Branch, Occupational Analysis Division, USAF Occupational Measurement Center.

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel. Additional copies are available upon request to the USAF Occupational Measurement Center, Attention: Chief, Occupational Analysis Division (OMY), Randolph AFB, Texas 78150-5000 (AUTOVON 487-6811).

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## SUMMARY OF RESULTS

1. Survey Coverage: The Metals Processing career ladder was surveyed to obtain current data for use in training management decisions. Survey results are based on responses from 459 members (68 percent of all assigned 427X4 career ladder personnel and 81 percent percent of all 427X4 personnel eligible for survey), with all using major commands well represented in the survey sample.

2. Specialty Jobs: Only one cluster and one independent job type were identified in the analysis. The cluster was comprised of six job groups, all of which were primarily involved in the performance of various technical duties of the career ladder. The lone independent job group was formed by personnel primarily performing supervisory, managerial, administrative, and training duties.

3. Career Ladder Progression: The 3- and 5-skill level jobs were highly technical, with very little responsibility for supervision or management. Seven-skill level members, although reporting a responsibility for and performing supervision, were still performing a job that was very technically oriented.

4. AFR 39-1 Specialty Descriptions: The description for the 3- and 5-skill level jobs accurately portrays the technical nature of the jobs. The 7-skill level description does not reflect the extent of day-to-day welding activity performed and tends to overstate the amount of activity in plating operations.

5. Training Analysis: The STS generally is well supported by survey data. Supply functions for the career ladder require review and the extent of coverage for electroplating operations should be examined. The POI, with one minor exception, is strongly supported by survey data; however, a series of tasks not referenced to any POI element require review in regard to the need for training and the most appropriate method of training if required.

6. Implications: The career ladder training documents (STS and POI) require some minor adjustments which will be considered at the projected Utilization and Training Workshop and the 7-skill level AFR 39-1 Specialty Description warrants changes in emphasis on some duties described.

# OCCUPATIONAL SURVEY REPORT
# METALS PROCESSING CAREER LADDER
# (AFSCs 42734, 42754, AND 42774)

## INTRODUCTION

This is a report of an occupational survey of the Metals Processing career ladder completed by the Occupational Analysis Division, USAF Occupational Measurement Center. This survey was requested by the 3330 Technical Training Wing, Chanute Technical Training Center, to obtain current task and equipment data for use in evaluation of the current training program. Previous survey results for this career ladder were published in September 1979.

### Background

Originally established as AFS 532X0 in 1951, the Metals Processing career ladder AFSC was changed to 531X1 in 1975, and received the current designation of 427X4 in April 1977. In October 1977, welding activities in support of civil engineering requirements were deleted from the specialty, thus leaving ~~Metals Processing~~ personnel involved primarily with aircraft, missile, and ground support equipment responsibilities.

As described in the AFR 39-1 specialty descriptions, personnel in this ladder are responsible for fabrication, repair, and surface treatment of metal parts and components. Meeting these requirements involves the performance of tasks pertaining to welding, cutting, brazing, forging, heat treating, and soldering a variety of metals. Primary entry into the career ladder is from Basic Military Training School (BMTS) through a Category A 12-week formal training course conducted at Chanute AFB, Illinois. Entry into the career ladder currently requires an Armed Forces Vocational Aptitude Battery (ASVAB) Mechanical score of 51.

Major topics discussed in this report include: (1) survey methodology; (2) comparison of specialty jobs (career ladder structure) and other survey data with career ladder documents, such as AFR 39-1 Specialty Descriptions, the Specialty Training Standard (STS), and the Plan of Instruction (POI); (3) analyses of Total Active Federal Military Service (TAFMS) groups and Duty Air Force Specialty Code (DAFSC) groups; (4) Major Air Command (MAJCOM) comparisons; (5) analyses of Continental United States (CONUS) versus overseas groups; (6) a compilation of responses to a special series of background questions; and (7) comparison of current survey data with previous survey data.

## SURVEY METHODOLOGY

### Inventory Development

The data collection instrument for this occupational survey was USAF Job Inventory AFPT 90-427-547, dated April 1984. A tentative task list was prepared after reviewing pertinent career ladder publications and directives, tasks from the previous survey instrument, and data from the last occupational survey report (OSR). This preliminary task list was refined and validated through personal interviews with 45 subject-matter specialists selected to cover a wide variety of 427X4 functions at the following locations:

3330 TCHTW Chanute AFB IL - Location of the ABR technical training course.

Eglin AFB - Heavy mobility commitment; operates under COMO; hosts TAC and AFSC units. Research and development projects supported by AFSC unit - more sophisticated equipment and exotic metals involved. Plasma-arc welding performed.

Charleston AFB - Supports both primary MAC weapons systems (C-141 and C-5); some electroplating is performed.

Pope AFB - MAC base with support to single primary weapon system; diversified function due to support of other organizations, such as 3 Mobile Aerial Port Squadron (MAPS), which maintains transport equipment such as hydraulic tanks and K-loaders.

Columbus AFB - Large volume of chemical cleaning; one of the few shops with electroplating capability.

Ellsworth AFB - Diversified weapon systems support; repairs to missile support equipment, and on-flightline welding repairs.

Cannon AFB - TAC unit with heavy mobility commitment; one of few units performing welding on gray cast iron metals.

Beale AFB - Heavy support of powered and nonpowered AGE (i.e., hydrosteam cleaning of AGE engines); some unique equipment.

Travis AFB - Diversified operation; performs jobs such as heat treating (one of few bases having infrared heat treating equipment) and electroplating; works with broad variety of metal alloy groups.

Castle AFB - One of few operational units visited using metallic inert gas (MIG) equipment.

Edwards AFB - Heavy support in Class II aircraft modifications, ongoing testing, and research and development; conducts and approves welder certification (does not send templates to depot-level as is customarily done by other units).

Nellis AFB - Two distinct CRS units performing slightly different jobs while sharing common shop space and equipment (e.g., one unit continues to perform some welding of high-pressure or cryogenic system stainless steels, while the other unit does not perform tasks related to high-pressure lines; or, one unit welds titanium while the other does not perform this function).

The resulting job inventory contained a comprehensive listing of 686 tasks grouped under 19 duty headings. The inventory also included a background section asking for such information as frequency of on-aircraft welding repair, work schedules, case hardening processes used, and tools and equipment used.

## Survey Administration

From April through September 1984, Consolidated Base Personnel Offices (CBPO) in operational units worldwide administered the inventory to job incumbents holding DAFSC 427X4. These job incumbents were selected from a computer-generated mailing list obtained from personnel data tapes maintained by the Air Force Human Resources Laboratory (AFHRL).

Each individual who completed the inventory first completed an identification and biographical information section and then checked each task performed in his or her current job. After checking all tasks performed, each member than rated each of these tasks on a 9-point scale showing relative time spent on that task, as compared to all other tasks checked. The ratings ranged from one (very small amount time spent) through five (about average time spent) to nine (very large amount time spent).

To determine relative time spent for each task checked by a respondent, all of an incumbent's ratings are assumed to account for 100 percent of his or her time spent on the job and are summed. Each task rating is then divided by the total task ratings and multiplied by 100 to provide a relative percentage of time for each task. This procedure provides a basis for comparing tasks in terms of both percent members performing and average percent time spent.

## Survey Sample

Personnel were selected to participate in this survey so as to ensure an accurate representation across major commands (MAJCOM) and paygrade groups. All eligible DAFSC 427X4 personnel were mailed survey booklets. Table 1 reflects the percentage distribution, by major command, of assigned personnel in the career ladder as of March 1984. Also listed in this table is the percent distribution, by major command, of respondents in the final survey sample. The 459 respondents included in the final sample represent 81 percent of the total 427X4 personnel eligible for the survey. Table 2 reflects the paygrade group distribution, while Table 3 lists the sample distribution by TAFMS groups. As reflected in these tables, the survey sample is an excellent representation of the career ladder population.

TABLE 1

COMMAND REPRESENTATION OF 427X4 SURVEY SAMPLE

| COMMAND | PERCENT OF ASSIGNED | PERCENT OF SAMPLE |
|---|---|---|
| TAC | 35 | 32 |
| SAC | 22 | 23 |
| USAFE | 12 | 11 |
| MAC | 11 | 12 |
| ATC | 10 | 10 |
| PACAF | 5 | 6 |
| AFSC | 3 | 4 |
| AAC | 2 | 2 |
| TOTAL | 100 | 100 |

Total Assigned* - 673

Total Eligible for Survey** - 567

Total in Sample - 459

Percent of Assigned in Sample - 68%
Percent of Eligible in Sample - 81%

* Manning figures as of March 1984.
Nine-skill level and CEM code personnel were not surveyed

** Excludes personnel in PCS, student, or hospital status, or with less than 6 weeks on the job

TABLE 2

PAYGRADE DISTRIBUTION OF SURVEY SAMPLE

| PAYGRADE | PERCENT OF ASSIGNED* | PERCENT OF SAMPLE |
|---|---|---|
| AIRMAN | 27 | 28 |
| E-4 | 29 | 25 |
| E-5 | 25 | 26 |
| E-6 | 13 | 14 |
| E-7 | 6 | 7 |

* Manning figures as of March 1984

TABLE 3

TAFMS DISTRIBUTION OF SURVEY SAMPLE

| TAFMS (MONTHS) | NUMBER IN SAMPLE | PERCENT OF OF SAMPLE |
|---|---|---|
| 1-48 | 161 | 35% |
| 49-96 | 140 | 31% |
| 97-144 | 71 | 15% |
| 145-192 | 46 | 10% |
| 193-240 | 32 | 7% |
| 241+ | 9 | 2% |

## Task Factor Administration

In addition to completing the job inventory, selected senior 427X4 personnel also completed a second booklet for either training emphasis (TE) or task difficulty (TD). The TE and TD booklets were processed separately from the job inventories. The information is used in a number of different analyses discussed in more detail within the report. Table 4 displays the sample representation across MAJCOM for TD and TE raters. While some MAJCOMs reflect low percentages of representation in some cases, the very high interrater agreement for the TD and TE groups indicates no adverse impact on the validity of the data.

Task Difficulty. Each individual completing a task difficulty booklet was asked to rate all of the tasks on a 9-point scale (from extremely low to extremely high) as to the relative difficulty of each task in the inventory. Difficulty is defined as the length of time required by the average member to learn to do the task. Task difficulty data were independently collected from 39 experienced 7-skill level personnel, stationed worldwide (see Table 4). The interrater reliability (as assessed through components of variance of standard group means) of .93 for these 427X4 raters suggests a high agreement among raters. Ratings were adjusted so tasks of average difficulty have ratings of 5.00. The resulting data are essentially a rank ordering of tasks indicating the degree of difficulty for each task in the inventory.

Job Difficulty Index (JDI). After computing a task difficulty rating for each task item, it is possible to compute a Job Difficulty Index (JDI) for the job groups identified in the survey analysis. This index provides a relative measure of which jobs, when compared to other jobs identified, are more or less difficult. The number of tasks performed and the average difficulty per unit spent (ADPUTS) are used as variables in an equation that calculates the JDI index. The index ranges from 1.0 for very easy jobs to 25.0 for very difficult jobs. The indices are adjusted so the average job difficulty index is 13.00. Thus, the more time a group spends on difficult tasks, and the more tasks they perform, the higher their job difficulty index.

Training Emphasis. Individuals completing training emphasis booklets were asked to rate tasks on a 10-point scale (from no training required to extremely heavy training required). Training emphasis is a rating of which tasks require structured training for first-term personnel. Structured training is defined as training provided at resident technical schools, field training detachments (FTD), mobile training teams (MTT), formal OJT, or any other organized training method. Training emphasis data were independently collected from 58 experienced 7-skill level personnel stationed worldwide (see Table 4). The interrater reliability (as assessed through components of variance of standard group means) for these raters was very high (.96), indicating that there was very high agreement among raters as to which tasks required some form of structured training and which did not. In this specialty, tasks rated high in training emphasis have ratings of 4.44 and above, with an average training emphasis of 2.75. As was discussed in the Task Difficulty section above, TE rating data may also be used to rank order tasks indicating those tasks which senior NCOs in the field consider the most important for first-term airmen to know.

When used in conjunction with the primary criterion of percent members performing, task difficulty and training emphasis ratings can provide insight into first-term personnel training requirements. Such insights may suggest a need for lengthening or shortening portions of instruction supporting AFS entry-level jobs.

TABLE 4

TASK FACTOR RATER MAJCOM DISTRIBUTION

| COMMAND | PERCENT OF 7-SKILL LEVELS ASSIGNED | PERCENT OF TASK DIFFICULTY RATERS | PERCENT OF TRAINING EMPHASIS RATERS |
|---|---|---|---|
| TAC | 32 | 36 | 17 |
| SAC | 24 | 28 | 31 |
| USAFE | 16 | 8 | 17 |
| MAC | 13 | 10 | 22 |
| ATC | 5 | 10 | 2 |
| PACAF | 5 | 0 | 2 |
| OTHER | 5 | 8 | 9 |

## SPECIALTY JOBS
## (Career Ladder Structure)

A key aspect of the USAF occupational analysis program is to examine the functional structure of the career ladder. The tasks performed by career ladder personnel are examined and job groups are formed based on the similarity of tasks performed and time spent on those tasks. This structure, as defined primarily by the tasks performed, is then compared to the organization defined by official career ladder documents. This analysis of actual jobs performed is made possible by the use of the Comprehensive Occupational Data Analysis Program (CODAP). This job information is used to examine the accuracy and completeness of career ladder documents (AFR 39-1 Specialty Descriptions and Specialty Training Standards) and to formulate an understanding of current utilization patterns.

Each individual in the survey sample performs a set of tasks called a Job. A group of individuals who perform many tasks in common, and spend similar amounts of time performing those tasks is called a Job Type. Job types having a substantial degree of similarity are grouped and called a Cluster. Those specialized job types too dissimilar to fit within a cluster are labeled Independent Job Types.

### Overview of Specialty Jobs

Structure analysis identified one cluster, comprised of six job types, and one independent job type within the survey sample. Based on task similarity and relative time spent, the best division of jobs performed by 427X4 personnel is illustrated in Figure 1. The cluster, job types, and independent job type are listed below. The group (GRP) number shown beside each title is a reference to computer printed information; the number of personnel in the group (N) is also shown. The number of personnel in the job types included in the cluster does not always equal the number of personnel shown for the cluster. The jobs performed by those few not included are adequately described by the cluster description.

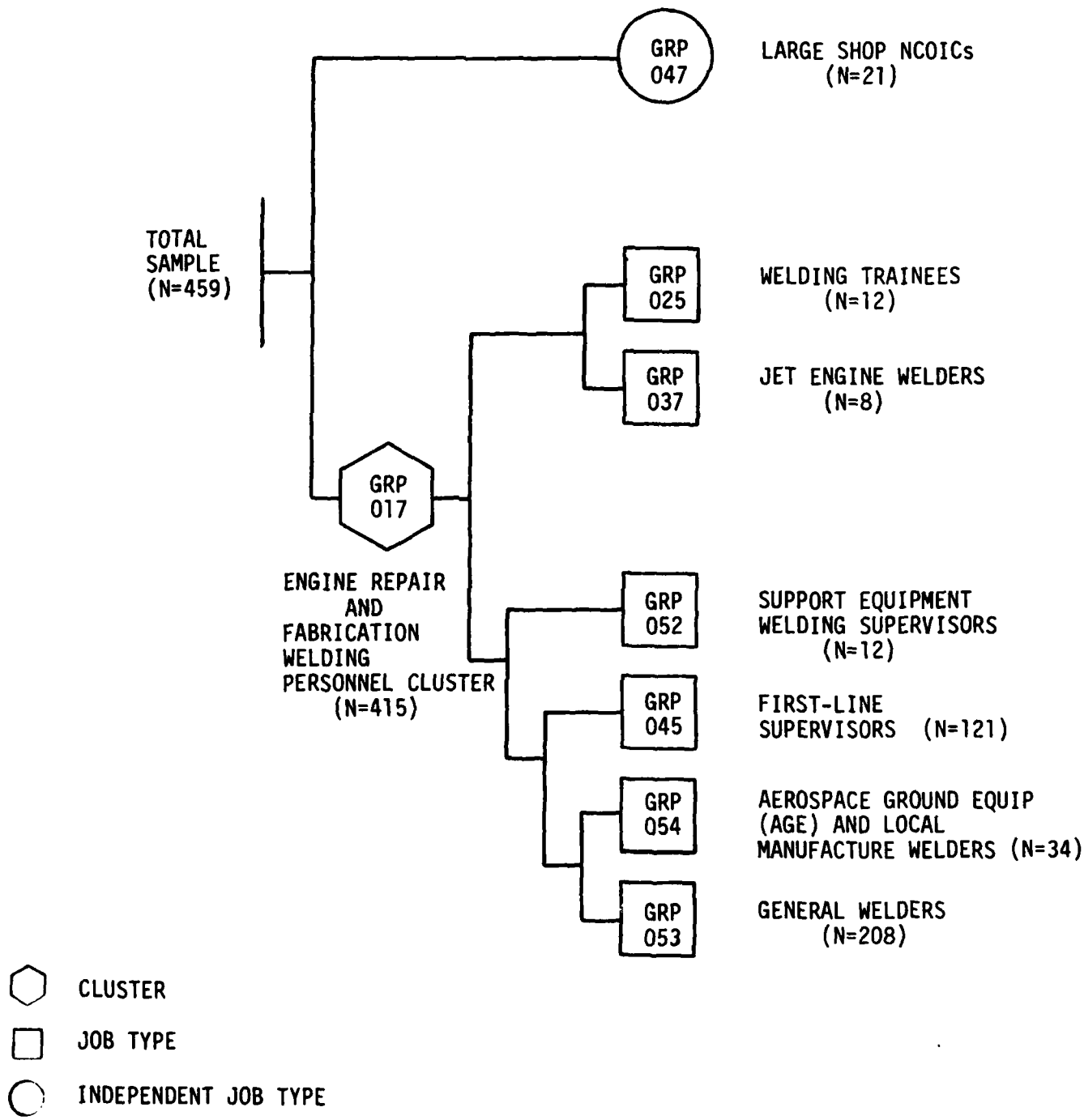
I. ENGINE REPAIR AND FABRICATION WELDING PERSONNEL CLUSTER (GRP017, (N=415)

- A. General Welders (GRP053, N=208)
- B. Aerospace Ground Equipment (AGE) and Local Manufacture Welders (GRP054, N=34)
- C. First-Line Supervisors (GRP045, N=121)
- D. Support Equipment Welding Supervisors (GRP052, N=12)
- E. Jet Engine Welders (GRP037, N=8)
- F. Welding Trainees (GRP025, N=12)

II. LARGE SHOP NCOICs (GRP047, N=21)

FIGURE 1

427X4 CAREER LADDER STRUCTURE



The respondents forming these groups account for 91 percent of the survey sample. The remaining nine percent were performing tasks or series of tasks that did not group with any of the defined job types. Some of the job titles given by respondents which were representative of these personnel, included Flightline Supervisor, Unit Combat Welder NCOIC, and Assistant Fabrication Branch Chief.

## Group Descriptions

The following paragraphs contain brief job descriptions of the cluster, job types, and the independent job type identified through the career ladder structure analysis. Selected background and job satisfaction data are provided for these groups in Tables 5 and 6. Representative tasks for each of the groups are contained in Appendix A of this report.

1. ENGINE REPAIR AND FABRICATION WELDING PERSONNEL CLUSTER (GRP017). Comprised of 6 different job groups and representing the vast majority of the sample (415 members and 90 percent of the total sample), this cluster was formed based on the performance of a wide range of tasks (an average of 190 are performed) concerned primarily with welding operations. While there are other functions associated with the Metals Processing career ladder (e.g., electroplating), group members spend 75 percent of their relative job time on tasks in technical duties involving welding operations, and an additional 10 percent is devoted to the administrative and supply-oriented aspects of the job. Welding operations tasks cover a range of activities to include planning and setting up projects; cleaning and preparing the appropriate equipment; testing, identifying, and cleaning metals to be used; and the performance of the welding or soldering processes themselves. Personnel in this cluster spend most of their actual welding time using the tungsten inert gas (TIG), oxyacetylene, or arc welding processes to repair aircraft engine components, aerospace ground equipment (AGE) components, or to fabricate fixtures, workstands, or aircraft support equipment. Typical tasks performed include:

weld repair powered or nonpowered AGE
make entries on AFTO Forms 349 (Maintenance Data Collection Record)
clean metals using wire wheels or blasting
set up for welding corner or edge joints
weld Hastelloy metals with TIG equipment
weld low or medium carbon steel with oxyacetylene equipment
weld repair cracks in jet engine exhaust systems

With an average grade of E-4 and an average of over 5 years in the career field, the cluster is dominated by 5- and 7-skill personnel (61 percent and 25 percent, respectively) and contains representatives from all the major commands using 427X4 resources. The cluster, while representing the essence of the job of this career ladder, includes identifiable job variations which are described in greater detail below.

A. General Welders (GRP053). This job group of 208 airmen is the largest of any formed in the sample and represents 45 percent of the sample population. Forming the technical core of the cluster, these members perform a relatively broad job encompassing the breadth of the Metals Processing career ladder and generally paralleling the description furnished for the cluster described above. This group differs from the cluster in that the scope of the job is not quite as broad (an average of 163 tasks performed versus 190 for the cluster) and these airmen are somewhat less experienced (an average of 45 months in the career ladder versus 65 months for the cluster as a whole).

B. Aerospace Ground Equipment (AGE) and Local Manufacture Welders (GRP054). The 34 airmen forming this group are distinguished from the overall cluster by their higher percentage of time spent on tasks involving metals processing procedures related to AGE and locally manufactured items. Sixty-two percent of these airmen indicated that 50 percent or more of their relative job time is devoted to performing welding tasks related to local manufacture of items, such as workstands, jacks, covers, or wheeled trailers. Of the 107 average tasks performed by these 3- and 5-skill level personnel (29 percent and 68 percent, respectively), the 3 technical tasks reflecting the highest average percent time spent by group members performing were:

weld repair powered or nonpowered AGE
fabricate aircraft related support equipment
such as trailers or storage racks
fabricate metal workstands or furniture

Contact with personnel in the field further confirmed their job orientation when they described responsibilities for fabrication or repair of such specific items as centerline tank dollies, towbars, and aircraft ladders.

C. First-Line Supervisors (GRP045). Eighty-two percent of this group reported that they were supervising other personnel, identifying themselves with titles, such as NCOICs, Working Leaders, or Working Supervisors. Averaging over 9 years in the career field, 41 percent of the 121 members (26 percent of the total sample) hold the 5-skill level, with 57 percent reporting 7-skill level DAFSCs. While the job is clearly supervisory in nature, 79 percent of their relative job time is spent on technical tasks pertaining to metals processing functions and the administrative and supply tasks associated with metals processing activities. Along with the welding and other technical tasks common to the cluster, these technician-supervisors performed basic supervisory and managerial tasks, such as:

write APRs
determine work priorities
supervise Metals Processing Specialists (AFSC 42754)
maintain supply records
conduct OJT
conduct training for qualification or certification
inspect certification plates

Performing an average of 296 tasks (highest of all the career ladder structure groups), this group's job is relatively difficult, with the highest Job Difficulty Index (18.87) of all the groups identified.

D. Support Equipment Welding Supervisors (GRP052). While similar in many ways to the supervisors discussed above, these 12 NCOs do vary in some noteworthy respects. Dominated by 7-skill level personnel (75 percent), this group is more senior and performs fewer tasks in the technical duty areas (average number of tasks performed is 154), with 51 percent of their relative duty time devoted to managerial, supervisory, training, and administrative or supply activities. These respondents indicate limited involvement with aircraft engine-type welding and primarily supervise personnel performing predominantly local manufacture-type welding tasks (see discussion of GRP054 above). Sixty-seven percent of these NCOs reported that they spend over 50 percent of their technical metals processing job time in activities pertaining to the local manufacture of items (i.e., workstands, jacks, covers, etc.) and 83 percent report assignment to smaller shops with less than seven 427X4 personnel assigned.

E. Jet Engine Welders (GRP037). This small group of 8 airmen is differentiated from the cluster by virtue of its concentration of relative job time (83 percent) on metals processing duties pertaining primarily to repairing aircraft and engine components. Sixty-three percent of the personnel in this group report working in relatively large shops (11 or more 427X4 personnel assigned), which tends to explain their specialization on engine component repair. In smaller shops, assigned personnel perform a much wider range of welding-related tasks (see discussion pertaining to General Welders). Typical of the average 88 tasks performed are:

weld repair cracks in jet engine exhaust systems
weld repair aircraft jet engine turbine section components
reshape aircraft jet engine components
weld Hastelloy metals with TIG equipment

F. Welding Trainees (GRP025). Representing 3 percent of the survey sample (12 members), this job group consists primarily of first-term airmen (83 percent, with 75 percent reporting between 1 and 12 months in the career field). Seventy-five percent still hold a 3-skill level DAFSC, and 42 percent report entry into the career ladder by directed duty assignment (DDA) (which was possible during this time frame). These airmen devote 65

percent of their relative job time to duties involving the performance of technical tasks pertaining to the maintenance of tools and equipment, cleaning metals, and setting up metals processing projects. The group performs a somewhat limited job (an average of only 68 tasks--lowest in the cluster), with only 39 tasks occupying over 50 percent of their job time. The limited number of tasks performed and the relatively low task difficulty rating for most of the predominant tasks result in the lowest JDI (2.75) of any job type in the career ladder structure. Typical tasks occupying most of their job time include:

grind metal surfaces
set up welding machines
clean work areas and machines
chip metal surfaces using hand tools
arc weld low or medium carbon steel, other than joints

With an average grade between E-2 and E-3, 17 months average time in the career field, and only 23 months average time in the service, personnel forming this group are the least experienced of all identified groups in the survey sample.

II. LARGE SHOP NCOICs (GRP047). Spending 77 percent of their relative job time performing tasks pertaining to general supervisory, managerial, training, and administrative or supply duties, 86 percent of this group of 21 NCOs report supervisory responsibilities (an average of 5 personnel are supervised). An additional 12 percent of their job time is committed to tasks involving project planning and equipment inspections, as well as performing metals tests and weld inspections. Highly experienced (91 percent report holding the 7-skill level), these group members reflect the highest experience level of all the groups identified (an average of over 12 years in the career field and almost 14 years in the service). With almost no technical task performance (which clearly distinguishes these NCOs from the previously discussed groups with supervisory responsibilities), typical supervisory and managerial-type tasks performed include:

assign personnel to duty positions
write or indorse APRs
supervise Metals Processing Technicians (AFSC 42774)
prepare letters of justification for supply-related matters
direct utilization of personnel
perform safety inspections of equipment or facilities

With an average grade of E-6, and performing an average of 180 tasks, these more senior NCOs tend to be assigned to larger shops (71 percent report working in shops where 7 or more 427X4 military personnel are

assigned). The assignment to larger shops tends to account for the group members' ability to concentrate their time on the managerial aspects of the career ladder since they would normally have Assistant NCOICs or Work Leaders to handle problems of a technical nature.

## Comparisons of Specialty Jobs

Only one cluster and one independent job type were identified in the career ladder structure analysis. The cluster (ENGINE REPAIR AND FABRICATION WELDING PERSONNEL) and the six job types within account for 90 percent of the total sample population. Personnel in the cluster, although varying to some degree in the scope of their jobs, were all generally similar and performed a variety of common welding and other metals processing technical tasks. Two groups within the cluster were distinguished primarily on the strength of their levels of supervisory responsibilities and involvement. No noteworthy degree of specialization around specific metals or welding techniques or equipment was identified. The lone independent job group was identified by virtue of the personnel in the group devoting almost all of their relative job time to general supervisory and managerial duties. Thus, the specialty job analysis and survey data tend to support the current career ladder structure.

Difficulty of career ladder jobs was compared using the Job Difficulty Index (JDI) described in the Task Factor Administration section of this report (average JDI = 13.00). Review of Table 5 reveals that both the cluster and the independent job type group reflect above average JDIs, with the LARGE SHOP NCOICs job being more difficult (JDI = 15.63) than the cluster. While the cluster as a whole reflected a JDI which was above average, it must be noted that there was a wide variance in the indices within the cluster (i.e., First-Line Supervisors JDI = 18.87 versus a JDI of only 2.75 for Welding Trainees).

In addition to reviewing the functions of jobs identified, it is also useful to compare the groups in terms of background characteristics and job attitudes. Table 6 presents career ladder job group data pertaining to job satisfaction indicators, such as expressed job interest, perceived utilization of talents and training, sense of accomplishment gained from the job, as well as reenlistment intentions.

Members of all the groups discussed indicate that the jobs performed are interesting, with all groups showing 75 percent or more responding positively. Perceived utilization of talents for each group was also high, with only one group (Support Equipment Welding Supervisors) showing less than an 80 percent positive response. Responses pertaining to the sense of accomplishment were also positive for all groups. It is interesting to note that the highest positive response in this area (92 percent) was given by the Welding Trainees group which, for all practical purposes, is just learning the job. Perceived use of training responses by all groups were very high, with no group showing less than a 90 percent positive response. In view of the

highly positive responses across the range of jobs, it is not surprising that each of the groups reflects positive reenlistment intent by 50 percent or more of the group members.

Review of the job inventory write-in comments from survey sample personnel further supports the very high job satisfaction indications for the career ladder as displayed in Table 6. When there are serious problems in a career field, survey respondents are usually quite free with write-in comments to complain about perceived problems in the field. Seventeen percent of the survey sample used the write-in feature to convey some type of information, yet only 9 percent of the comments (representing just 2 percent of the survey sample) could be characterized as complaints. No particular trends were noted across the few comments received.

This analysis supports the current classification structure. Job satisfaction question responses indicate that the individuals and training received are well matched to the job characteristics of the career ladder and, consequently, a rather large percentage of the airmen in the sample expressed positive reenlistment intentions.

TABLE 5

SELECTED BACKGROUND DATA FOR SPECIALTY JOB GROUPS

| | ENGINE REPAIR AND FABRICATION WELDING PERSONNEL CLUSTER (GRP017) | GENERAL WELDERS (GRP053) | AGE AND LOCAL MANUFACTURE WELDERS (GRP054) | FIRST-LINE SUPERVISORS (GRP045) | SUPPORT EQUIPMENT WELDING SUPERVISORS (GRP052) | JET ENGINE WELDERS (GRP037) | WELDING TRAINEES (GRP025) | LARGE SHOP NCOICs (GRP047) |
|---|---|---|---|---|---|---|---|---|
| NUMBER IN GROUP | 415 | 208 | 34 | 121 | 12 | 8 | 12 | 21 |
| PERCENT OF TOTAL SAMPLE | 90% | 45% | 7% | 26% | 3% | 2% | 3% | 5% |
| PERCENT IN CONUS | 76% | 80% | 71% | 68% | 58% | 62% | 92% | 76% |
| DAFSC DISTRIBUTION | | | | | | | | |
| 42734 | 14% | 14% | 29% | 2% | 0% | 38% | 75% | 0% |
| 42754 | 61% | 75% | 68% | 41% | 25% | 62% | 25% | 9% |
| 42774 | 25% | 11% | 3% | 57% | 75% | 0% | 0% | 91% |
| AVERAGE GRADE | E-4 | E-4 | E-3,E-4 | E-5 | E-5,E-6 | E-3 | E-2,E-3 | E-6 |
| AVERAGE MONTHS IN CAREER FIELD | 65 | 45 | 37 | 110 | 131 | 33 | 17 | 145 |
| AVERAGE MONTHS IN SERVICE | 80 | 58 | 57 | 129 | 158 | 43 | 23 | 166 |
| PERCENT IN FIRST-ENLISTMENT | 37% | 51% | 50% | 6% | 0% | 75% | 83% | 0% |
| PERCENT SUPERVISING | 40% | 22% | 6% | 82% | 83% | 0% | 8% | 86% |
| AVERAGE NUMBER TASKS PERFORMED | 190 | 163 | 107 | 296 | 154 | 88 | 68 | 180 |
| JOB DIFFICULTY INDEX (JDI) (AVERAGE JDI =13.00) | 13.30 | 12.37 | 7.15 | 18.87 | 11.10 | 7.42 | 2.75 | 15.63 |

TABLE 6

COMPARISONS OF JOB SATISFACTION INDICATORS BY SPECIALTY JOB GROUPS
(PERCENT MEMBERS RESPONDING)*

| | ENGINE REPAIR AND FABRICATION WELDING PERSONNEL CLUSTER (GRP017) | GENERAL WELDERS (GRP053) | AGE AND LOCAL MANUFACTURE WELDERS (GRP054) | FIRST-LINE SUPERVISORS (GRP045) | SUPPORT EQUIPMENT WELDING SUPERVISORS (GRP052) | JET ENGINE WELDERS (GRP037) | WELDING TRAINEES (GRP025) | LARGE SHOP NCOICs (GRP047) |
|---|---|---|---|---|---|---|---|---|
| EXPRESSED JOB INTEREST: | | | | | | | | |
| DULL | 4 | 2 | 12 | 5 | 8 | 0 | 0 | 5 |
| SO-SO | 7 | 7 | 6 | 6 | 0 | 25 | 17 | 9 |
| INTERESTING | 88 | 90 | 79 | 88 | 92 | 75 | 75 | 86 |
| PERCEIVED UTILIZATION OF TALENTS: | | | | | | | | |
| VERY LITTLE OR NOT AT ALL | 7 | 5 | 12 | 8 | 25 | 0 | 8 | 14 |
| FAIRLY WELL TO PERFECTLY | 93 | 95 | 85 | 92 | 75 | 100 | 92 | 81 |
| PERCEIVED UTILIZATION OF TRAINING: | | | | | | | | |
| VERY LITTLE OR NOT AT ALL | 4 | 4 | 9 | 4 | 8 | 0 | 0 | 10 |
| FAIRLY WELL TO PERFECTLY | 96 | 96 | 91 | 96 | 92 | 100 | 100 | 90 |
| SENSE OF ACCOMPLISHMENT GAINED FROM YOUR JOB: | | | | | | | | |
| DISSATISFIED | 9 | 8 | 15 | 11 | 17 | 25 | 0 | 9 |
| AMBIVALENT | 7 | 5 | 12 | 6 | 8 | 12 | 8 | 10 |
| SATISFIED | 84 | 87 | 73 | 83 | 75 | 63 | 92 | 81 |
| REENLISTMENT INTENTIONS: | | | | | | | | |
| NO, WILL RETIRE | 4 | 1 | 3 | 8 | 17 | 12 | 0 | 14 |
| NO, OR PROBABLY NO | 28 | 37 | 26 | 15 | 8 | 25 | 50 | 5 |
| YES, OR PROBABLY YES | 67 | 62 | 71 | 76 | 75 | 63 | 50 | 81 |

* Columns may not add to 100 percent due to nonresponse or rounding

## ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with the analysis of the career ladder structure, is an important part of each occupational survey. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information may then be used to evaluate how well career ladder documents, such as AFR 39-1 Specialty Descriptions and the Specialty Training Standard (STS), reflect what career ladder personnel are actually doing in the field.

A comparison of the duty and task performance between DAFSCs 42734 and 42754 indicated that, while there are some minor differences, by and large, the jobs they perform are essentially the same. Therefore, they will be discussed as a combined group in this report. Nine-skill level and CEM code personnel in the 427XX career field were not surveyed and will not be discussed in this report.

The distribution of skill-level groups across the career ladder jobs is displayed in Table 7, while Table 8 offers another perspective by displaying the relative percent time spent on each duty across the skill-level groups. A typical pattern of progression is present with personnel spending more of their relative time on duties involving supervisory, managerial, and administrative tasks (see Table 8, Duties A, B, C, D, and E) as they move upward to the 7-skill level. It is also obvious, though, that 7-skill level personnel are still very involved with technical task performance, as will be pointed out in the specific skill-level group discussions below.

### Skill Level Descriptions

DAFSCs 42734/42754. The 324 airmen in the 3- and 5-skill level group (representing 71 percent of the survey sample) performed an average of 162 tasks, with 85 tasks accounting for over 50 percent of their job time. Performing a highly technical job, 83 percent of their relative duty time is devoted to tasks covering a variety of metals processing activities, such as planning and setting up projects; caring for equipment; testing, cleaning, and heat treating metals; as well as performing the various types of welding operations. Tasks pertaining to administrative and supply actions accounted for an additional 9 percent of their duty time. Table 9 displays some representative tasks performed by these airmen, as well as an indication of differences between the 7-skill level group.

DAFSC 42774. Seven-skill level personnel, representing 29 percent of the survey sample, perform an average of 231 tasks, with 135 tasks accounting for over 50 percent of their relative job time. Even though 84 percent of the group report supervisory responsibilities, only 48 percent of their relative job time is spent on tasks in the usual supervisory, managerial, training, and administrative or supply duty areas (see Table 8). Only 14 percent of the 135 people forming this group are found in the "LARGE SHOP NCOICs" job type discussed earlier in the SPECIALTY JOBS section (the one job that was

predominantly supervisory in nature). A review of Table 7 shows that 58 percent of the 7-skill level personnel are found in the jobs that were identified as technician-supervisory oriented (First-Line Supervisors and Support Equipment Welding Supervisors). While Table 9 clearly shows these senior personnel are responsible for supervision in their shops, it also reflects the range of the job, in that they are also technicians performing a wide variety of day-to-day metals processing activities technical tasks.

## Summary

Career ladder progression is evident, with personnel at the 3- and 5-skill levels spending the vast majority of their job time performing technical tasks. At the 7-skill level, although members still perform many technical tasks, the shift to supervisory functions is quite clear. While distinctions are clear, with both groups performing a substantial amount of common day-to-day technical metal processing work, it can also be said that there is a high degree of commonality within this career ladder.

TABLE 7

DISTRIBUTION OF DAFSC GROUPS ACROSS CAREER LADDER JOBS*

| CAREER LADDER JOBS | DAFSC 42734/54 (N=324) NUMBER | DAFSC 42734/54 (N=324) PERCENT | DAFSC 42774 (N=135) NUMBER | DAFSC 42774 (N=135) PERCENT |
|---|---|---|---|---|
| I. ENGINE REPAIR AND FABRICATION WELDING PERSONNEL CLUSTER (N=415) | 311 | 96% | 104 | 77% |
| IA. GENERAL WELDERS (N=208) | 185 | 57% | 23 | 17% |
| IB. AGE AND LOCAL MANUFACTURE WELDERS (N=34) | 33 | 10% | 1 | 1% |
| IC. FIRST-LINE SUPERVISORS (N=121) | 52 | 16% | 69 | 51% |
| ID. SUPPORT EQUIPMENT WELDING SUPERVISORS (N=12) | 3 | 1% | 9 | 7% |
| IE. JET ENGINE WELDERS (N=8) | 8 | 2% | 0 | 0% |
| IF. WELDING TRAINEES (N=12) | 12 | 4% | 0 | 0% |
| II. LARGE SHOP NCOICs (N=21) | 2 | 1% | 19 | 14% |
| NOT GROUPED | 11 | 3% | 12 | 9% |

* Some groups will not add to total "N" since some DAFSC group members work in "one-of-a-kind" type jobs

TABLE 8

AVERAGE PERCENT TIME SPENT PERFORMING DUTIES BY DAFSC GROUPS

| DUTIES | DAFSC 42734/54 (N=324) | DAFSC 42774 (N=135) |
|---|---|---|
| A ORGANIZING AND PLANNING | 2 | 7 |
| B DIRECTING AND IMPLEMENTING | 2 | 8 |
| C INSPECTING AND EVALUATING | 2 | 9 |
| D TRAINING | 2 | 7 |
| E PERFORMING ADMINISTRATION AND SUPPLY FUNCTIONS | 9 | 17 |
| F PLANNING AND SETTING UP METAL PROCESSING PROJECTS | 16 | 10 |
| G MAINTAINING TOOLS AND EQUIPMENT | 19 | 10 |
| H TESTING AND IDENTIFYING METALS | 5 | 4 |
| I CLEANING METALS | 5 | 3 |
| J HEAT TREATING METALS | 3 | 3 |
| K ELECTROPLATING METALS | * | * |
| L PERFORMING OXYACETYLENE WELDING OPERATIONS | 6 | 3 |
| M PERFORMING TUNGSTEN INERT GAS (TIG) SHIELDED WELDING OPERATIONS | 15 | 10 |
| N PERFORMING METALLIC INERT GAS (MIG) SHIELDED WELDING OPERATIONS | 1 | * |
| O PERFORMING ARC WELDING OPERATIONS | 4 | 3 |
| P PERFORMING RESISTANCE WELDING OPERATIONS | * | * |
| Q REPAIRING AIRCRAFT OR MISSILE STRUCTURES AND COMPONENTS | 4 | 2 |
| R PERFORMING FABRICATION OPERATIONS | 2 | 2 |
| S MAINTAINING AUXILIARY METAL COMPONENTS AND STRUCTURES | 3 | 2 |

* Less than 1 percent

TABLE 9

DISPLAY OF REPRESENTATIVE TASKS FOR AND DIFFERENCES
BETWEEN DAFSC GROUPS
(PERCENT MEMBERS RESPONDING)

| TASKS | | 42734/54 (N=324) | 42774 (N=135) |
|---|---|---|---|
| I362 | FILE METAL SURFACES | 90 | 70 |
| L445 | WELD LOW OR MEDIUM CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 77 | 67 |
| F238 | SET UP FOR METAL CUTTING USING POWERED EQUIPMENT | 69 | 51 |
| Q650 | WELD REPAIR CRACKS IN JET ENGINE EXHAUST SYSTEMS | 63 | 53 |
| R662 | FORGE METALS TO SHAPE USING BLACKSMITH TOOLS (HEAT SOURCE) | 58 | 47 |
| Q609 | FILLET WELD REPAIR AIRCRAFT JET ENGINE COMPONENTS, SUCH AS LINERS OR NOZZLES | 54 | 47 |
| Q644 | WELD REPAIR AIRCRAFT JET ENGINE COMBUSTION SECTION COMPONENTS, SUCH AS FLAMEHOLDERS | 52 | 46 |
| M472 | WELD MAGNESIUM OR MAGNESIUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 50 | 48 |
| | * * * * * * * * * * * * * * * * * * * * * * * * * * * * | | |
| E182 | MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 75 | 84 |
| G260 | CLEAN MACHINES | 94 | 73 |
| I357 | CLEAN METALS USING OXYACETYLENE WELDING EQUIPMENT | 78 | 62 |
| M458 | WELD HASTELLOY METALS WITH TIG EQUIPMENT | 79 | 73 |
| G292 | PERFORM OPERATOR MAINTENANCE ON STATIONARY TIG EQUIPMENT | 78 | 73 |
| H338 | PERFORM HARDNESS TESTS USING STATIONARY EQUIPMENT | 74 | 77 |
| S677 | WELD REPAIR POWERED OR NONPOWERED AEROSPACE GROUND EQUIPMENT (AGE) | 85 | 76 |
| L433 | HEAT TREAT METALS WITH OXYACETYLENE EQUIPMENT | 66 | 57 |
| F233 | SET UP CASTINGS FOR BRAZING | 63 | 56 |
| J371 | ANNEAL FERROUS METALS | 57 | 56 |
| J394 | STRESS RELIEVE FERROUS METALS | 55 | 58 |
| | * * * * * * * * * * * * * * * * * * * * * * * * * * * * | | |
| A5 | DETERMINE WORK PRIORITIES | 45 | 91 |
| C97 | WRITE APRs | 22 | 90 |
| A15 | PLAN OR SCHEDULE WORK ASSIGNMENTS AND PRIORITIES | 30 | 81 |
| B59 | SUPERVISE METALS PROCESSING SPECIALISTS (AFSC 42754) | 26 | 80 |
| E154 | COMPLETE WORK REQUESTS FOR METAL PROCESSING PROJECTS | 24 | 68 |
| E179 | MAINTAIN SUPPLY RECORDS | 23 | 68 |
| A22 | SCHEDULE LEAVES OR PASSES | 9 | 66 |
| D110 | CONDUCT TRAINING FOR QUALIFICATION OR CERTIFICATION | 16 | 61 |
| E167 | ISSUE SUPPLIES AND EQUIPMENT | 14 | 55 |

## ANALYSIS OF AFR 39-1 SPECIALTY DESCRIPTIONS

Survey data by skill level were compared to the AFR 39-1 Specialty Descriptions for the Metals Processing Specialist and Metals Processing Technician, dated 1 January 1982. These descriptions are intended to give a broad overview of the duties and tasks performed in each skill level of the specialty.

The 3- and 5-skill level description appears to be complete and accurately displays the highly technical nature of the job.

The 7-skill level description is generally accurate and portrays the technical nature of the job along with the supervisory responsibilities. There are two areas of the description, however, which warrant review. While paragraph 1, SPECIALTY SUMMARY, mentions 7-skill level airmen "perform welding", paragraph 2, DUTIES AND RESPONSIBILITIES, does not follow-up and discuss the extent of or types of welding activities in which they engage. As was discussed in the ANALYSIS OF DAFSC GROUPS section, 7-skill level airmen are still deeply involved in day-to-day welding functions. Tasks presented in Table 10 further display this welding operation involvement. Conversely, the specialty description devotes most of the discussion in paragraph 2c to tasks related to plating operations. Again, a review of Table 10 shows a series of tasks pertaining to plating operations, with only one task showing as many as 11 percent performing. This was the highest activity for any of the tasks in the plating duty area.

Based on the data presented in the ANALYSIS OF DAFSC GROUPS section and the examples of tasks performed displayed in Table 10, it appears that the 7-skill level description should be considered for adjustments in future updates of the job description.

TABLE 10

SELECTED TASK DATA RELATING TO WELDING AND PLATING OPERATIONS
FOR DAFSC 42774 PERSONNEL
(PERCENT MEMBERS PERFORMING)

| SELECTED REPRESENTATIVE TASKS | | DAFSC 42774 (N=135) |
|---|---|---|
| | (WELDING OPERATIONS) | |
| F244 | SET UP FOR WELDING BUTT JOINTS | 82 |
| M245 | WELD ALUMINUM OR ALUMINUM ALLOYS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 80 |
| G292 | PERFORM OPERATOR MAINTENANCE ON STATIONARY TIG EQUIPMENT | 73 |
| M248 | WELD HASTELLOY METALS WITH TIG EQUIPMENT | 73 |
| M464 | WELD INCONEL METAL BUTT JOINTS WITH TIG EQUIPMENT | 68 |
| L445 | WELD LOW OR MEDIUM CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 67 |
| 0550 | ARC WELD LOW OR MEDIUM CARBON STEEL PIPE JOINTS | 64 |
| Q650 | WELD REPAIR CRACKS IN AIRCRAFT JET ENGINE EXHAUST SYSTEMS | 53 |
| R654 | FABRICATE AIRCRAFT RELATED SUPPORT EQUIPMENT, SUCH AS TRAILERS OR STORAGE RACKS | 50 |
| | * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * | |
| | (PLATING OPERATIONS) | |
| G276 | PERFORM OPERATOR MAINTENANCE ON ELECTROPLATING EQUIPMENT | 11 |
| K402 | ELECTROPLATE FERROUS METALS | 9 |
| K404 | PERFORM CADMIUM PLATING OF FERROUS METALS | 8 |
| K411 | STRIP CADMIUM PLATING FROM METALS | 8 |
| K398 | ANALYZE PLATING SOLUTIONS | 7 |
| K401 | DISPOSE OF CONTAMINATED PLATING SOLUTIONS | 7 |
| K408 | PREPARE ACID CLEANING SOLUTIONS | 7 |
| K410 | PREPARE PLATING SOLUTIONS | 6 |

## ANALYSIS OF TAFMS GROUPS

Utilization patterns for survey respondents in different Total Active Federal Military Service (TAFMS) groups were reviewed to determine how jobs change over time. As is typical in most career ladders, as time in service for 427X4 personnel increased, there was a corresponding increase in the performance of duties involving supervisory and managerial tasks (see Table 11). As time spent in supervisory and managerial duties increased, performance time on tasks in the technical metals processing functions generally declined. Through the third enlistment (97-144 months) the job remained primarily technical, with only 35 percent of the relative job time spent on supervisory, managerial, training, and administrative, or supply duties. It was not until the fourth enlistment (145-192 months) that supervisory, managerial, training, and administrative functions accounted for the majority of the respondents' relative job time. Even then, a review of Table 11 shows these personnel were still very active in day-to-day technical metals processing functions. This corresponds with the findings mentioned for the 7-skill level group in the ANALYSIS OF DAFSC GROUPS.

A more in-depth evaluation of the first-enlistment group will be presented in the TRAINING ANALYSIS section of this report.

Comparisons of group perceptions of their jobs help career field managers to understand some of the factors which may affect the job performance of today's airmen. These perceptions were captured by including four job satisfaction questions in the survey instrument covering job interest, perceived utilization of talents and training, and reenlistment intentions. Table 12 presents data displaying the responses of selected TAFMS groups. Comparisons were also made against a comparative sample of other Mission Equipment Maintenance career ladders surveyed in 1984.

Comparisons of the group responses reflect that the job satisfaction indicators pertaining to job interest, and perceived utilization of talents and training are all substantially higher for each of the 427X4 groups contrasted with the comparative sample. Positive responses to these questions by 427X4 personnel in the high 80 and 90 percent range are unusually high. While positive reenlistment intentions for 427X4 personnel are also quite high, they are slightly lower than two of the comparative sample groups. This may be because 427X4 personnel have developed a skill which has a direct utilization transfer to the civilian economy.

According to their responses to these job satisfaction indicators, 427X4 airmen are highly satisfied with their jobs and the kind of work they do. These data discussed here tend to support the comments mentioned in the SPECIALTY JOBS section where the low percentage of write-in complaints was noted.

TABLE 11

RELATIVE TIME SPENT ON DUTIES BY TAFMS GROUPS

| DUTIES | MONTHS TAFMS 1-48 (N=161) | 49-96 (N=140) | 97-144 (N=71) | 145-192 (N=46) | 193-240 (N=32) |
|---|---|---|---|---|---|
| A ORGANIZING AND PLANNING | * | 2 | 4 | 8 | 8 |
| B DIRECTING AND IMPLEMENTING | * | 3 | 5 | 10 | 10 |
| C INSPECTING AND EVALUATING | * | 3 | 6 | 11 | 10 |
| D TRAINING | * | 3 | 6 | 8 | 8 |
| E PERFORMING ADMINISTRATION AND SUPPLY FUNCTIONS | 6 | 12 | 14 | 18 | 16 |
| F PLANNING AND SETTING UP METAL PROCESSING PROJECTS | 18 | 15 | 11 | 9 | 9 |
| G MAINTAINING TOOLS AND EQUIPMENT | 21 | 17 | 14 | 9 | 9 |
| H TESTING AND IDENTIFYING METALS | 5 | 5 | 5 | 4 | 5 |
| I CLEANING METALS | 6 | 5 | 4 | 2 | 2 |
| J HEAT TREATING METALS | 3 | 3 | 3 | 2 | 3 |
| K ELECTROPLATING METALS | * | * | * | * | * |
| L PERFORMING OXYACETYLENE WELDING OPERATIONS | 6 | 5 | 5 | 3 | 3 |
| M PERFORMING TUNGSTEN INERT GAS (TIG) SHIELDED WELDING OPERATIONS | 17 | 14 | 12 | 9 | 9 |
| N PERFORMING METALLIC INERT GAS (MIG) SHIELDED WELDING OPERATIONS | * | * | * | * | * |
| O PERFORMING ARC WELDING OPERATIONS | 5 | 5 | 3 | 2 | 3 |
| P PERFORMING RESISTANCE WELDING OPERATIONS | * | * | * | * | * |
| Q REPAIRING AIRCRAFT OR MISSILE STRUCTURES AND COMPONENTS | 4 | 4 | 3 | 2 | 2 |
| R PERFORMING FABRICATION OPERATIONS | 2 | 2 | 2 | 1 | 1 |
| S MAINTAINING AUXILIARY METAL COMPONENTS AND STRUCTURES | 3 | 2 | 2 | 1 | 2 |

* Less than 1 percent

TABLE 12

COMPARISON OF JOB SATISFACTION INDICATORS BY TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)*

| | 1-48 MONTHS TAFMS | | 49-96 MONTHS TAFMS | | 97+ MONTHS TAFMS | |
|---|---|---|---|---|---|---|
| | 427X4 (N=161) | COMPARATIVE SAMPLE** (N=7,891) | 427X4 (N=140) | COMPARATIVE SAMPLE (N=3,015) | 427X4 (N=157) | COMPARATIVE SAMPLE (N=3,790) |
| EXPRESSED JOB INTEREST: | | | | | | |
| DULL | 1 | 11 | 4 | 11 | 7 | 9 |
| SO-SO | 9 | 17 | 9 | 18 | 5 | 15 |
| INTERESTING | 89 | 72 | 86 | 70 | 87 | 74 |
| PERCEIVED UTILIZATION OF TALENTS: | | | | | | |
| LITTLE OR NOT AT ALL | 6 | 23 | 9 | 23 | 10 | 19 |
| FAIRLY WELL TO PERFECTLY | 94 | 77 | 91 | 77 | 89 | 80 |
| PERCEIVED UTILIZATION OF TRAINING: | | | | | | |
| LITTLE OR NOT AT ALL | 2 | 21 | 5 | 22 | 9 | 21 |
| FAIRLY WELL TO PERFECTLY | 98 | 79 | 95 | 78 | 91 | 78 |
| REENLISTMENT INTENTIONS: | | | | | | |
| NO, OR PROBABLY NO | 45 | 40 | 30 | 23 | 6 | 8 |
| YES, OR PROBABLY YES | 55 | 60 | 68 | 74 | 82 | 76 |

* Columns may not add to 100 percent due to nonresponse or rounding
** Comparative sample of Mission Equipment Maintenance career ladders surveyed in 1984 (Includes AFSCs 321XX, 322XX, 328XX, 404X1, 423XX, 427X5, and 461X0)

## TRAINING ANALYSIS

Occupational survey data are one of the many sources of information which can be used to assist in the development of a training program relevant to the needs of personnel working in their first assignment within a career ladder. Factors which may be used in evaluating training include the overall description of the job being performed by first-enlistment personnel and their overall distribution across career ladder jobs, percentages of first-job (1-24 months TAFMS) or first-enlistment (1-48 months TAFMS) members performing specific tasks or using certain equipment or procedures, as well as training emphasis and task difficulty ratings (previously explained in the SURVEY METHODOLOGY section).

To assist specifically in the evaluation of the Specialty Training Standard (STS) and the Plan of Instruction (POI), technical school personnel from Chanute Technical Training Center, Chanute Air Force Base, Illinois, matched job inventory tasks to appropriate sections and subsections of the STS and POI for Course C3ABR42734 000. It was this task matching upon which comparison to those documents was based. A complete computer listing displaying the percent members performing tasks, training emphasis ratings for each task, task difficulty ratings for each task, along with STS and POI matchings, has been forwarded to the technical school for their use in further detailed reviews of training documents. Summaries of the above-mentioned data and information are given below.

### First-Enlistment Personnel

First-enlistment personnel (1-48 months TAFMS) spend the majority of their job time performing tasks involving planning and setting up metals processing projects and performing various types of welding operations in the process of repairing aircraft and engine components, as well as fabricating various types of aircraft support items.

Table 13 presents a display of just a few tasks which are representative of the average 138 tasks performed by this group. These airmen also spent a substantial amount of their relative duty time (27 percent) maintaining tools and equipment and performing the administrative and supply tasks involved in their jobs. Distribution of first-term personnel across career ladder jobs is displayed in Figure 2, reflecting the fact that first-termers are directly involved in day-to-day general metals processing activities, with minimal career ladder specialization. The highly technical nature of the first-term airman's job is reflected by the fact that less than 3 percent of their relative duty time involves supervising, managerial, or training task performance. Tools and equipment used or operated by 20 percent or more airmen in this group are listed in Table 14. This type of information is useful for technical school and MAJCOM training personnel so they can focus limited training time or other resources on the most utilized items.

## Training Emphasis

Training emphasis (TE) ratings are helpful in building a rank ordering of the tasks considered important for first-term airmen training based on the collective judgments of senior career ladder NCOs currently working at operational locations in the field (see discussion of TE raters in the SURVEY METHODOLOGY section). Table 15 lists the 20 highest rated tasks for the 427X4 career ladder. These few tasks are displayed only as examples to illustrate the various types of data (primary - percent members performing; supporting - training emphasis and task difficulty) which can be used to assist in the evaluation of training documents. While the tasks in Table 15 are the highest rated tasks according to TE ratings, there are many additional tasks which are also rated high in training emphasis. These tasks are furnished in descending order on a computer listing contained in the TRAINING EXTRACT package and should be reviewed in detail by training personnel.

TABLE 13

REPRESENTATIVE TASKS PERFORMED BY FIRST-ENLISTMENT PERSONNEL

| TASKS | | PERCENT MEMBERS PERFORMING (N=161) |
|---|---|---|
| G258 | CHANGE GAS CYLINDERS | 98 |
| F257 | SET UP WELDING MACHINE | 97 |
| F215 | CLEAN WORK AREA | 95 |
| I363 | GRIND METAL SURFACES | 95 |
| G260 | CLEAN MACHINES | 94 |
| F244 | SET UP FOR WELDING BUTT JOINTS | 94 |
| G261 | CLEAN OR STORE HAND TOOLS | 91 |
| M452 | WELD ALUMINUM OR ALUMINUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 91 |
| F246 | SET UP FOR WELDING FILLET JOINTS | 90 |
| M447 | ADJUST WATER FLOW, GAS FLOW, OR AMPERAGE WHEN WELDING WITH TUNGSTEN INERT GAS (TIG) EQUIPMENT | 89 |
| L437 | SILVER SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 88 |
| F245 | SET UP FOR WELDING CORNER OR EDGE JOINTS | 87 |
| I352 | CLEAN METALS BY BLASTING | 86 |
| M471 | WELD LOW OR MEDIUM CARBON STEELS WITH TIG EQUIPMENT | 85 |
| L426 | CUT LOW, MEDIUM, OR HIGH CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 85 |
| S677 | WELD REPAIR POWERED OR NONPOWERED AGE | 83 |
| G301 | REMOVE OR REPLACE GAS REGULATORS ON TIG WELDING EQUIPMENT | 80 |
| M458 | WELD HASTELLOY METALS WITH TIG EQUIPMENT | 78 |
| F239 | SET UP FOR PORTABLE WELDING OPERATIONS | 78 |
| 0551 | ARC WELD LOW OR MEDIUM CARBON STEELS, OTHER THAN JOINTS | 78 |
| M459 | WELD HEAT AND CORROSION RESISTANT STAINLESS STEEL BUTT JOINTS WITH TIG EQUIPMENT | 77 |
| G286 | PERFORM OPERATOR MAINTENANCE ON PORTABLE OXYACETYLENE EQUIPMENT | 77 |
| M461 | WELD HIGH CARBON STEELS WITH TIG EQUIPMENT | 74 |
| M464 | WELD INCONEL METAL BUTT JOINTS WITH TIG EQUIPMENT | 69 |
| M492 | WELD 4130 LOW ALLOY STEEL TEE JOINTS WITH TIG EQUIPMENT | 68 |
| H338 | PERFORM HARDNESS TESTS USING STATIONARY EQUIPMENT | 68 |
| E182 | MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 67 |
| L422 | BRAZE STEEL CASTINGS WITH OXYACETYLENE EQUIPMENT | 64 |
| M449 | WELD A-286 METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 62 |
| R662 | FORGE METALS TO SHAPE USING BLACKSMITH TOOLS (HEAT SOURCE) | 60 |
| L433 | HEAT TREAT METALS WITH OXYACETYLENE EQUIPMENT | 60 |
| F219 | PARTICIPATE IN DESIGN OF PARTS TO BE FABRICATED | 58 |
| Q650 | WELD REPAIR CRACKS IN AIRCRAFT JET ENGINE EXHAUST SYSTEMS | 57 |
| R657 | FABRICATE METAL WORK STANDS OR FURNITURE | 53 |
| J377 | HARDEN FERROUS METALS | 51 |
| R654 | FABRICATE AIRCRAFT RELATED SUPPORT EQUIPMENT, SUCH AS TRAILERS OR STORAGE RACKS | 47 |

* Average number of tasks performed - 138

FIGURE 2

DISTRIBUTION OF FIRST-ENLISTMENT PERSONNEL
ACROSS SPECIALTY JOBS
(N=161)

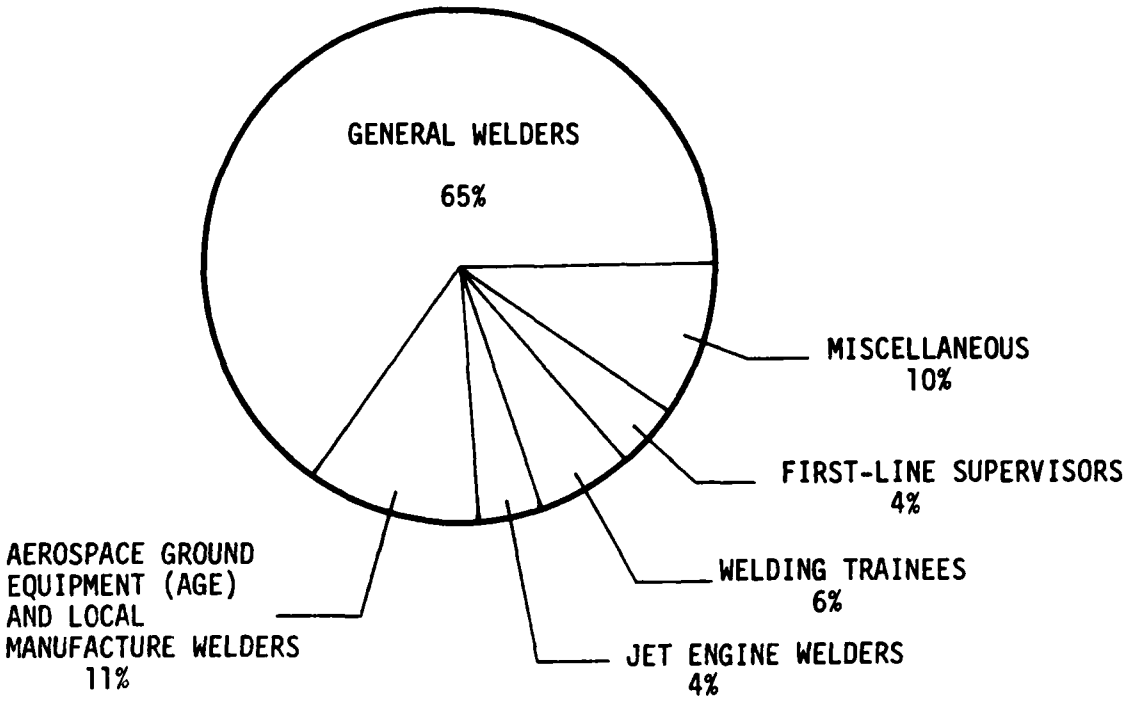


TABLE 14

TOOLS OR EQUIPMENT USED OR OPERATED BY
20 PERCENT OR MORE OF FIRST-ENLISTMENT PERSONNEL
(1-48 MONTHS TAFMS)

| TOOLS OR EQUIPMENT USED OR OPERATED | PERCENT MEMBERS RESPONDING (N=161) |
|---|---|
| TUNGSTEN INERT GAS (TIG) WELDING EQUIPMENT | 98 |
| ELECTRODES | 98 |
| PORTABLE OXYACETYLENE EQUIPMENT | 97 |
| PERSONAL SAFETY EQUIPMENT | 94 |
| HAND HACKSAWS | 94 |
| COMPOSITE TOOL KIT (CTK) | 93 |
| BENCH/PEDESTAL GRINDERS | 93 |
| SAND BLASTER (GLASSBEADS) | 93 |
| METALLIC ARC WELDING EQUIPMENT | 93 |
| PNEUMATIC GRINDERS | 89 |
| HAND DRILLING MACHINES | 89 |
| BAND CUTOFF SAWS | 83 |
| STATIONARY HARDNESS TESTING EQUIPMENT | 83 |
| POWER-OPERATED WIRE BRUSHING OR BUFFING EQUIPMENT | 81 |
| PNEUMATIC DISC SANDERS | 79 |
| METAL SHEARS | 75 |
| CIRCULATING AIR HEAT TREATING FURNACES | 69 |
| ROTARY GRINDERS | 68 |
| STATIONARY OXYACETYLENE WELDING EQUIPMENT | 68 |
| STILL AIR HEAT TREATING FURNACE | 57 |
| HEAT TREATING EQUIPMENT (NOT FURNACES) | 50 |
| METALWORKING MEASURING DEVICES | 39 |
| POWER HACKSAWS | 37 |
| RESISTANCE SPOT WELDING EQUIPMENT | 35 |
| CARBON AIR ARC WELDING EQUIPMENT | 29 |
| RESISTANCE FOIL WELDING EQUIPMENT | 29 |
| COMBUSTIBLE GAS INDICATORS | 29 |
| METALLIC INERT GAS (MIG) WELDING EQUIPMENT | 29 |
| PYROMETERS | 28 |
| DRAFTING EQUIPMENT | 24 |
| PORTABLE HARDNESS TESTING EQUIPMENT | 22 |
| CENTERLESS GRINDERS | 22 |
| POWER PRESSES | 21 |

TABLE 15

TASKS RATED HIGHEST IN TRAINING EMPHASIS

| TASKS | | PERCENT MEMBERS PERFORMING 1ST ENL (N=161) | TOTAL SAMPLE (N=459) | TNG EMP* | TASK DIFF** |
|---|---|---|---|---|---|
| M452 | WELD ALUMINUM OR ALUMINUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 91 | 90 | 6.97 | 5.09 |
| M453 | WELD ALUMINUM OR ALUMINUM ALLOY TEE JOINTS WITH TIG EQUIPMENT | 85 | 82 | 6.90 | 5.36 |
| F257 | SET UP WELDING MACHINE | 97 | 90 | 6.81 | 4.18 |
| M458 | WELD HASTELLOY METALS WITH TIG EQUIPMENT | 78 | 78 | 6.55 | 5.29 |
| M459 | WELD HEAT AND CORROSION RESISTANT STAINLESS STEEL BUTT JOINTS WITH TIG EQUIPMENT | 77 | 82 | 6.50 | 5.21 |
| M448 | WELD A-286 BUTT JOINTS WITH TIG EQUIPMENT | 70 | 68 | 6.48 | 5.25 |
| M460 | WELD HEAT AND CORROSION RESISTANT STAINLESS STEEL TEE JOINTS WITH TIG EQUIPMENT | 71 | 76 | 6.45 | 5.35 |
| F244 | SET UP FOR WELDING BUTT JOINTS | 94 | 90 | 6.45 | 4.34 |
| M488 | WELD 410 MARTENSITIC STAINLESS STEEL TEE JOINTS WITH TIG EQUIPMENT | 53 | 58 | 6.45 | 5.50 |
| M487 | WELD 410 MARTENSITIC STAINLESS STEEL METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 55 | 59 | 6.43 | 5.28 |
| M447 | ADJUST WATERFLOW, GAS FLOW, OR AMPERAGE WHEN WELDING WITH TIG EQUIPMENT | 89 | 89 | 6.41 | 4.02 |
| F250 | SET UP FOR WELDING TEE JOINTS | 86 | 86 | 6.38 | 4.58 |
| M450 | WELD A-286 TEE JOINTS WITH TIG EQUIPMENT | 62 | 61 | 6.33 | 5.70 |
| M454 | WELD ALUMINUM OR ALUMINUM ALLOY TUBE AND SHEET JOINTS WITH TIG EQUIPMENT | 65 | 70 | 6.31 | 5.86 |
| M464 | WELD INCONEL METAL BUTT JOINTS WITH TIG EQUIPMENT | 69 | 68 | 6.29 | 5.16 |
| G258 | CHANGE GAS CYLINDERS | 98 | 92 | 6.28 | 2.85 |
| M486 | WELD 410 MARTENSITIC STAINLESS STEEL BUTT JOINTS WITH TIG EQUIPMENT | 56 | 64 | 6.28 | 5.26 |
| M465 | WELD INCONEL METAL TEE JOINTS WITH TIG EQUIPMENT | 62 | 63 | 6.26 | 5.43 |
| F242 | SET UP FOR SILVER SOLDERING | 95 | 91 | 6.22 | 4.21 |
| M485 | WELD TITANIUM OR TITANIUM ALLOYS, OTHER THAN JOINTS, WITH TIG EQUIPMENT USING TRAILING SHIELDS | 27 | 29 | 6.22 | 6.47 |

* Mean Training Emphasis rating is 2.75 and Standard Deviation is 1.69

** Task Difficulty rating of 5.00 is average

## Specialty Training Standard (STS)

A comprehensive review of STS 427X4, dated April 1979, compared STS items to survey data. STS paragraphs containing general knowledge information or subject matter knowledge requirements were not evaluated. Since proficiency coding policy has been changed in the January 1985 ATC supplement to AFR 8-13, no analysis of the codings in this old version of the STS was made. Training personnel will be expected to rework these codes as a matter of course in the next rewrite of the STS. Overall, the STS provides comprehensive coverage of the work performed by personnel in the field, with survey data supporting the significant paragraphs or subparagraphs. While some tasks did not have high percentages of personnel performing them, above average TE ratings or the fact that the tasks were a part of an identifiable job being performed in the career ladder supports the retention of STS elements involving those tasks.

A few elements of the STS, however, do require review by training personnel and subject-matter specialists. Table 16 displays data pertaining to these elements. Paragraph 5A., Supervision, has 4 subelements pertaining to supply-related activities. Although the overall paragraph (5A) is oriented toward managers and supervisors, a substantial number of 5-skill level airmen also responded to these supply tasks (see Table 16). Further, review of Table 17, which displays a number of tasks not keyed to the STS but which are performed by 20 percent or more members of one of the DAFSC groups covered in the STS, reflects that some of these tasks are also supply-related. Again, a significant percentage of the 5-skill level airmen responded to these tasks. Since there are a series of supply-type tasks and there are significant percentages of nonsupervisory level personnel responding to them, it would appear appropriate to delete the references to supply functions in paragraph 5A (Supervision) and establish a completely separate line item (paragraph) in the STS covering all supply activities.

Table 16 also lists examples of three (paragraphs 24d, 24e, and 24f) of some nine elements specifically keyed to electroplating operations. Review of these selected samples, as well as the other six elements, reflects relatively low percentages of the various groups performing the tasks (see discussion of the 7-skill level description in the ANALYSIS OF AFR 39-1 SPECIALTY DESCRIPTIONS section), with TE ratings generally below the mean rating. The tasks involved do have above average TD ratings and it is recognized that some few bases do have electroplating shops. However, while retention of some degree of coverage of electroplating operations is not in question, these elements should be reviewed by training specialists and subject-matter specialists to evaluate and justify the extensive amount and detail of the coverage.

## Plan of Instruction (POI)

Based on the previously mentioned assistance from technical school subject-matter specialists in matching inventory tasks to the 3ABR42734 000 POI, dated 13 September 1983, a computer product was generated displaying the results of the matching process. Information furnished for consideration includes percent members performing data for first-job (1-24 months TAFMS) and first-enlistment (1-48 months TAFMS) personnel, as well as training emphasis (TE) and task difficulty (TD) ratings.

Nearly all POI blocks and units of instruction are well supported by survey data (based on percentages of first-term personnel performing tasks or high TE or TD ratings for pertinent tasks) or are justified because tasks are safety-related and cannot be omitted. Only one area requires further evaluation by training personnel and subject-matter specialists. Review of Block IV, Unit 7a, Fusion Welding of Ferrous Castings, involving 7 hours of course time, reveals that only 14 percent of the first-job and first-enlistment personnel responded to a task pertaining to fusion welding gray cast iron with oxyacetylene equipment. While the TD rating for this task is above average (5.78), the TE rating for this task (2.60) is below the mean rating. The combination of low TE rating and low percentages of first termers performing requires a close look at justification for retention of this unit of instruction in the ABR course.

Additionally, some apparently significant tasks with high training emphasis, above average task difficulty ratings, and 30 percent or more first-job or first-enlistment personnel performing were not matched to any POI blocks of instruction. This combination of factors indicates formal training may be required and resident technical training could be supported. Table 18 lists a sampling of a number of such tasks. Subject-matter specialists and training personnel should perform an in-depth review of this series of tasks to determine the necessity for training and the most effective method to accomplish it.

Overall, the current training program appears to be highly effective, with first-term personnel rendering very high positive ratings on utilization of training (see Table 12, ANALYSIS OF TAFMS GROUPS section), while other job satisfaction indicators have also been very positive for any grouping of respondents examined.

TABLE 16

STS ELEMENTS REQUIRING REVIEW

| STS ELEMENT (WITH SELECTED SAMPLE TASKS) | PERCENT MEMBERS PERFORMING 1ST JOB | 1ST ENL | DAFSC 42754 | DAFSC 42774 | TNG EMP* | TASK DIFF** | |
|---|---|---|---|---|---|---|---|
| **5a.(1)(a) OBTAIN INFORMATION FOR SPECIAL REQUISITIONS** | | | | | | | |
| E190 ORDER MATERIALS OR SUPPLIES | 15 | 17 | 46 | 83 | 3.76 | 4.18 | |
| E186 MAKE ENTRIES ON DD FORMS 1348-6 (NON-NSN REQUISITION (MANUAL)) | 4 | 4 | 24 | 74 | 2.67 | 4.47 | |
| E185 MAKE ENTRIES ON DD FORMS 1348-1 (SINGLE LINE ITEM RELEASE/RECEIPT DOCUMENT) | 12 | 9 | 23 | 61 | 2.12 | 3.98 | E201 |
| RESEARCH SUPPLY PUBLICATIONS FOR IDENTIFICATION OR PROCUREMENT OF MATERIALS | 4 | 5 | 25 | 56 | 1.84 | 5.40 | |
| **24d. PREPARE RATING SOLUTIONS** | | | | | | | |
| K410 PREPARE PLATING SOLUTIONS | 2 | 3 | 5 | 6 | 2.31 | 6.38 | |
| **24e. TEST PLATING SOLUTIONS** | | | | | | | |
| K398 ANALYZE PLATING SOLUTIONS | 1 | 2 | 3 | 7 | 2.14 | 6.48 | |
| **24f. ELECTROPLATE AIRCRAFT PARTS** | | | | | | | |
| K402 ELECTROPLATE FERROUS METALS | 12 | 11 | 12 | 9 | 2.64 | 5.56 | |
| K404 PERFORM CADMIUM PLATING OF FERROUS METALS | 11 | 11 | 13 | 8 | 2.62 | 5.76 | |
| K403 ELECTROPLATE NONFERROUS METALS | 5 | 5 | 4 | 4 | 2.17 | 6.03 | |

* Mean TE rating is 2.75 and Standard Deviation is 1.69 (High TE = 4.44)
** Average TD rating is 5.00

TABLE 17

EXAMPLES OF TASKS PERFORMED BY 20 PERCENT OR MORE GROUP MEMBERS AND NOT REFERENCED TO THE STS

| TASKS | | PERCENT MEMBERS PERFORMING 1ST JOB | 1ST ENL | 5-SKILL LEVEL | 7-SKILL LEVEL | TE RATING* | TD RATING** |
|---|---|---|---|---|---|---|---|
| G301 | REMOVE OR REPLACE GAS REGULATORS ON TIG WELDING EQUIPMENT | 74 | 80 | 86 | 67 | 5.38 | 2.88 |
| M474 | WELD MAGNESIUM OR MAGNESIUM ALLOYS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 38 | 48 | 53 | 44 | 5.15 | 5.83 |
| G313 | REMOVE OR REPLACE TIG WELDING EQUIPMENT COMPONENTS OR ACCESSORIES | 60 | 69 | 78 | 58 | 4.98 | 4.15 |
| C93 | PERFORM SAFETY INSPECTIONS OF EQUIPMENT OR FACILITIES | 25 | 31 | 44 | 81 | 4.62 | 4.51 |
| H347 | VISUALLY INSPECT METAL SURFACES USING MAGNIFICATION | 33 | 33 | 44 | 44 | 3.45 | 3.76 |
| E200 | RECEIVE MATERIALS OR SUPPLIES | 42 | 45 | 61 | 76 | 3.31 | 3.03 |
| L443 | WELD HIGH CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 28 | 33 | 31 | 27 | 3.19 | 5.37 |
| G275 | PERFORM OPERATOR MAINTENANCE ON COMBUSTIBLE GAS INDICATORS | 19 | 24 | 26 | 26 | 3.10 | 4.95 |
| M457 | WELD COPPER OR COPPER ALLOYS WITH TIG EQUIPMENT | 7 | 8 | 16 | 24 | 3.10 | 5.51 |
| E179 | MAINTAIN SUPPLY RECORDS | 7 | 8 | 27 | 68 | 3.09 | 4.49 |
| E212 | TURN IN GAS CYLINDERS | 12 | 27 | 39 | 67 | 3.05 | 3.53 |
| E167 | ISSUE SUPPLIES AND EQUIPMENT | 2 | 4 | 16 | 55 | 2.91 | 3.02 |
| A16 | PLAN OR UPDATE SAFETY PROGRAMS | 0 | 6 | 17 | 62 | 2.90 | 4.36 |
| E191 | ORDER TECHNICAL PUBLICATIONS | 5 | 6 | 18 | 41 | 2.62 | 4.29 |
| E193 | PICK-UP OR DELIVER WELDING EQUIPMENT, OTHER THAN GAS CYLINDERS | 4 | 8 | 16 | 25 | 2.62 | 3.44 |
| Q624 | REPAIR DAMAGED AIRCRAFT STRUCTURAL MEMBERS | 9 | 14 | 19 | 20 | 2.47 | 6.01 |
| E180 | MAINTAIN WORK ORDER FILES | 5 | 3 | 18 | 57 | 2.45 | 4.08 |
| S671 | WELD CRACKS IN TEST CELLS | 12 | 19 | 21 | 29 | 2.41 | 5.23 |
| S674 | WELD REPAIR CRACKS IN SOUND SUPPRESSORS | 15 | 23 | 24 | 21 | 2.17 | 5.05 |
| E152 | COMPLETE ACCIDENT OR INCIDENT REPORT FORMS | 0 | 1 | 8 | 42 | 1.98 | 4.65 |
| E162 | IDENTIFY SUPPLY PROBLEMS | 6 | 7 | 21 | 65 | 1.90 | 5.26 |
| E158 | ESTABLISH PROCEDURES FOR ACCOUNTABILITY OF SUPPLIES AND EQUIPMENT | 5 | 4 | 16 | 48 | 1.71 | 5.19 |
| E208 | REVIEW SUPPLY OR EQUIPMENT REQUIREMENTS WITH ALLOWANCE AND AUTHORIZATION OFFICE | 0 | 0 | 10 | 50 | 1.09 | 4.62 |

* Mean TE rating is 2.75 and Standard Deviation is 1.69

** Average TD rating is 5.00

TABLE 18

SAMPLING OF TASKS NOT REFERENCED TO 3ABR42734 000 POI BLOCKS
(30 PERCENT OR MORE RESPONDING)

| EXAMPLES OF TASKS NOT REFERENCED | | PERCENT MEMBERS PERFORMING 1ST JOB (N=85) | 1ST ENL (N=161) | TNG EMP* | TASK DIFF** |
|---|---|---|---|---|---|
| M448 | WELD A-286 BUTT JOINTS WITH TIG EQUIPMENT | 67 | 70 | 6.48 | 5.25 |
| M487 | WELD 410 MARTENSITIC STAINLESS STEEL METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 51 | 55 | 6.43 | 5.28 |
| M450 | WELD A-286 TEE JOINTS WITH TIG EQUIPMENT | 58 | 62 | 6.33 | 5.70 |
| M454 | WELD ALUMINUM OR ALUMINUM ALLOY TUBE AND SHEET JOINTS WITH TIG EQUIPMENT | 53 | 65 | 6.31 | 5.86 |
| M464 | WELD INCONEL METAL BUTT JOINTS WITH TIG EQUIPMENT | 62 | 69 | 6.29 | 5.16 |
| M465 | WELD INCONEL METAL TEE JOINTS WITH TIG EQUIPMENT | 55 | 62 | 6.26 | 5.43 |
| M449 | WELD A-286 METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 58 | 62 | 6.17 | 5.31 |
| M456 | WELD CHROMOLOY METALS WITH TIG EQUIPMENT | 33 | 47 | 6.00 | 5.00 |
| F251 | SET UP FOR WELDING TUBE AND SHEET JOINTS | 55 | 62 | 5.81 | 5.01 |
| M461 | WELD HIGH CARBON STEELS WITH TIG EQUIPMENT | 67 | 74 | 5.35 | 5.30 |
| M467 | WELD INCONEL METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 54 | 60 | 5.91 | 5.27 |
| M484 | WELD TITANIUM OR TITANIUM ALLOYS, OTHER THAN JOINTS, WITH TIG EQUIPMENT, WITHOUT USING TRAINING SHIELDS | 31 | 40 | 5.72 | 6.72 |
| M493 | WELD 4130 LOW ALLOY STEEL TUBE AND SHEET JOINTS WITH TIG EQUIPMENT | 40 | 54 | 5.65 | 5.15 |
| M451 | WELD A-286 TUBE AND SHEET JOINTS WITH TIG EQUIPMENT | 35 | 47 | 5.62 | 5.88 |
| M468 | WELD L-605 COBALT ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 37 | 41 | 5.48 | 5.59 |
| M469 | WELD L-605 COBALT ALLOY TEE JOINTS WITH TIG EQUIPMENT | 31 | 37 | 5.47 | 5.71 |
| F219 | PARTICIPATE IN DESIGN OF PARTS TO BE FABRICATED | 49 | 58 | 4.69 | 5.31 |

* Mean TE rating is 2.75 and Standard Deviation is 1.69 (High TE = 4.44)
** Average TD rating is 5.00

## MAJCOM AND CONUS-OVERSEAS GROUP COMPARISONS

Tasks performed in various metals processing duty areas and background data for personnel of the major commands (MAJCOM) with the largest 427X4 populations were compared to determine whether job content varied as a function of MAJCOM assignment.

No significant variations in time spent on the various duty areas pertaining to metals processing activities were identified. While the overall jobs performed across the commands were very similar, slight variations in the percentages of members performing some specific tasks could be noted. ATC members responded in lesser numbers to tasks pertaining to welding titanium with tungsten inert gas (TIG) equipment. Also notable was the slightly higher percentage of ATC, MAC, AFSC, and AAC personnel responding to tasks pertaining to electroplating activities. By and large, however, the jobs performed across the various commands were essentially the same.

Similarly, comparisons of 5-skill level CONUS and overseas groups revealed little difference in jobs performed by these groups.

## SPECIAL ANALYSIS SECTION

In response to requests for a variety of different types of information by technical training personnel, MAJCOM functional managers, and supervisors in the field, a series of background questions were included in the survey instrument. The types of questions varied and included such items as the percentage of job time spent on local manufacture type welding, responsibility for furnace calibration, the number of times personnel were involved in environmental-type inspections, and where most metals processing activities were accomplished. The data responding to these varied questions are compiled in table format and are presented in Appendix B (Tables B1 through B7 of this report).

## COMPARISON OF CURRENT SURVEY TO PREVIOUS SURVEY

The results of this survey were compared to those of Occupational Survey Report (OSR) AFPT 90-427-381, dated September 1979. Comparisons were made to job specialty groups and job satisfaction indicators for selected TAFMS groups.

Table 19 displays the comparisons of the job specialty groups applicable to most 427X4 personnel in 1984 and the groups identified in the 1979 sample. From this comparison, aside from a slightly more definitive titling process, it is clear that by and large the 427X4 career ladder has changed little since 1979 and the similarity of jobs identified in both samples reflect a relatively stable career ladder.

Review of the comparisons of job satisfaction indicators by TAFMS groups in Table 20 indicates that positive responses for 1984 respondents are equal to or higher for all categories compared. The most notable difference is reflected in the positive reenlistment intentions, where the 1984 first-term airmen responses were substantially higher than the 1979 first-term group. The high percentage of positive responses reflects a career ladder where personnel are happy in their jobs (as previously displayed in the SPECIALTY JOBS section) and, even though possessing a highly marketable skill, the majority plan to stay with the US Air Force.

TABLE 19

JOB SPECIALTY COMPARISONS BETWEEN CURRENT AND PREVIOUS SURVEYS

| 1984 SURVEY (N=459) | PERCENT OF SAMPLE | 1979 SURVEY (N=517) | PERCENT OF SAMPLE |
|---|---|---|---|
| ENGINE REPAIR AND FABRICATION WELDING PERSONNEL CLUSTER (N=415) | 90 | NO CLUSTER DESIGNATED | - |
| GENERAL WELDERS (N=208) | 45 | WELDING CRAFTSMEN (N=221) | 43 |
| AGE AND LOCAL MANUFACTURE WELDERS (N=34) | 7 | NOT IDENTIFIED | - |
| FIRST-LINE SUPERVISORS (N=121) | 26 | SHOP SUPERVISORS (N=108) | 21 |
| SUPPORT EQUIPMENT WELDING SUPERVISORS (N=12) | 3 | | |
| JET ENGINE WELDERS (N=8) | 2 | JET ENGINE WELDERS (N=6) | 1 |
| WELDING TRAINEES (N=12) | 3 | JOURNEYMAN WELDERS (N=33) | 6 |
| LARGE SHOP NCOICs (N=21) | 5 | NOT IDENTIFIED | - |
| NOT IDENTIFIED* | - | BRANCH SUPERINTENDENTS (N=113) | 22 |

* 42799 and 42700 personnel were not surveyed in 1984

TABLE 20

COMPARISON OF CURRENT SURVEY AND 1979 SURVEY TAFMS GROUPS
(PERCENT MEMBERS RESPONDING)

| JOB SATISFACTION INFORMATION: | 1-48 MONTHS | | 49-96 MONTHS | | 97+ MONTHS | |
|---|---|---|---|---|---|---|
| | 1984 (N=161) | 1979 (N=170) | 1984 (N=140) | 1979 (N=118) | 1984 (N=157) | 1979 (N=228) |
| JOB FAIRLY INTERESTING OR BETTER | 89 | 87 | 86 | 81 | 87 | 87 |
| TALENTS UTILIZED FAIRLY WELL OR BETTER | 94 | 88 | 91 | 88 | 89 | 87 |
| TRAINING UTILIZED FAIRLY WELL OR BETTER | 98 | 91 | 95 | 92 | 92 | 85 |
| FAVORABLY CONSIDERING REENLISTMENT | 55 | 28 | 68 | 52 | 82 | 67 |

## IMPLICATIONS

This survey was requested by training personnel to assist in evaluating current training programs. Review of the Specialty Training Standard (STS) indicated only two areas that may require some adjustments. One area simply involves a regrouping of supply-type activities into a single independent line item in the STS (coupling some tasks previously listed in the supervisory area with some obviously supply-oriented tasks which were not matched to any STS element). The second area relates to what appears to be excessive coverage for a very limited activity in the overall functioning of the career ladder (electroplating operations). These questions should be addressed at the planned Utilization and Training Workshop.

The evaluation of the Plan of Instruction (POI) for the ABR course for the career ladder revealed only a minor problem with one unit of instruction dealing with fusion welding of ferrous castings (7 hours) which was not supported by survey data. A series of tasks performed by substantial numbers of first-term personnel (which also reflect high TE and TD ratings) must also be reviewed for possible inclusion in the ABR course.

Analysis also indicated that the AFR 39-1 Specialty Description for the 7-skill level does not reflect the extent of involvement of these senior technicians in day-to-day welding and other metals processing activities, while overemphasizing the amount of activity in plating operations.

# APPENDIX A

## SELECTED REPRESENTATIVE TASKS PERFORMED BY CAREER LADDER STRUCTURE GROUPS

TABLE I

GROUP ID NUMBER AND TITLE: GRP017 - ENGINE REPAIR AND FABRICATION WELDING PERSONNEL CLUSTER

GROUP SIZE: 415 PERCENT OF SAMPLE: 90%

AVERAGE GRADE: E-4 AVERAGE TICF: 65 MONTHS

AVERAGE TAFMS: 80 MONTHS

The following are in descending order by percent members performing:

| TASKS | PERCENT MEMBERS PERFORMING |
|---|---|
| F257 SET UP WELDING MACHINE | 97 |
| I363 GRIND METAL SURFACES | 96 |
| F246 SET UP FOR WELDING FILLET JOINTS | 95 |
| M452 WELD ALUMINUM OR ALUMINUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 95 |
| F250 SET UP FOR WELDING TEE JOINTS | 93 |
| L437 SILVER SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 93 |
| M471 WELD LOW OR MEDIUM CARBON STEELS WITH TIG EQUIPMENT | 90 |
| S677 WELD REPAIR POWERED OR NONPOWERED AGE | 89 |
| I352 CLEAN METALS BY BLASTING | 87 |
| F256 SET UP WELDING FIXTURES OR ATTACHMENTS | 86 |
| G286 PERFORM OPERATOR MAINTENANCE ON OXYACETYLENE EQUIPMENT | 83 |
| M458 WELD HASTELLOY METALS WITH TIG EQUIPMENT | 82 |
| E182 MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 81 |
| 0551 ARC WELD LOW OR MEDIUM CARBON STEELS | 80 |
| H338 PERFORM HARDNESS TESTS USING STATIONARY EQUIPMENT | 79 |
| L433 HEAT TREAT METALS WITH OXYACETLYLENE EQUIPMENT | 70 |
| Q650 WELD REPAIR CRACKS IN AIRCRAFT JET ENGINE EXHAUST SYSTEMS | 64 |
| R657 FABRICATE METAL WORK STANDS OR FURNITURE | 64 |
| E200 RECEIVE MATERIALS OR SUPPLIES | 63 |
| L420 BRAZE GRAY CAST IRON WITH OXYACETYLENE EQUIPMENT | 62 |
| J394 STRESS RELIEVE FERROUS METALS | 61 |
| J371 ANNEAL FERROUS METALS | 61 |
| R662 FORGE METALS TO SHAPE USING BLACKSMITH TOOLS | 60 |
| F217 MAKE DRAWINGS OF PARTS OR ASSEMBLIES FOR SHOP OR FIELD PROJECTS | 60 |
| J378 HARDEN NONFERROUS METALS | 59 |
| L438 SILVER SOLDER NONFERROUS METALS WITH OXYACETYLENE EQUIPMENT | 58 |
| R654 FABRICATE AIRCRAFT RELATED SUPPORT EQUIPMENT, SUCH AS TRAILERS OR STORAGE RACKS | 55 |
| Q609 FILLET WELD REPAIR AIRCRAFT JET ENGINE COMPONENTS, SUCH AS LINERS OR NOZZLES | 55 |
| F216 DETERMINE PROCESSING REQUIREMENTS FROM DRAWINGS, BLUEPRINTS, OR SPECIFICATIONS | 53 |
| M474 WELD MAGNESIUM OR MAGNESIUM ALLOYS WITH TIG EQUIPMENT | 52 |

TABLE IA

GROUP ID NUMBER AND TITLE: GRP053 - General Welders

GROUP SIZE: 208 PERCENT OF SAMPLE: 45%

AVERAGE GRADE: E-4 AVERAGE TICF: 45 MONTHS

AVERAGE TAFMS: 58 MONTHS

The following are in descending order by percent members performing:

| TASKS | PERCENT MEMBERS PERFORMING |
|---|---|
| F257 SET UP WELDING MACHINE | 99 |
| M447 ADJUST WATERFLOW, GAS FLOW, OR AMPERAGE WHEN WELDING WITH TUNGSTEN INERT GAS (TIG) EQUIPMENT | 97 |
| M452 WELD ALUMINUM OR ALUMINUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 97 |
| I363 GRIND METAL SURFACES | 96 |
| L437 SILVER SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 96 |
| M471 WELD LOW OR MEDIUM CARBON STEELS WITH TIG EQUIPMENT | 93 |
| S677 WELD REPAIR POWERED OR NONPOWERED AEROSPACE GROUND EQUIPMENT (AGE) | 92 |
| I352 CLEAN METALS BY BLASTING | 92 |
| L436 PREHEAT METALS WITH OXYACETYLENE EQUIPMENT | 91 |
| L426 CUT LOW, MEDIUM, OR HIGH CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 90 |
| H348 VISUALLY INSPECT WELDS FOR DEFECTS | 89 |
| M490 WELD 4130 LOW ALLOY STEEL BUTT JOINTS WITH TIG EQUIPMENT | 88 |
| F239 SET UP FOR PORTABLE WELDING OPERATIONS | 87 |
| M458 WELD HASTELLOY METALS WITH TIG EQUIPMENT | 86 |
| G292 PERFORM OPERATOR MAINTENANCE ON STATIONARY TIG EQUIPMENT | 86 |
| O551 ARC WELD LOW OR MEDIUM CARBON STEELS, OTHER THAN JOINTS | 84 |
| E182 MAKE ENTRIES ON AFTO FORMS 349 (MAINTANENCE DATA COLLECTION RECORD | 81 |
| M464 WELD INCONEL METAL BUTT JOINTS WITH TIG EQUIPMENT | 80 |
| L434 LEAD SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 77 |
| L433 HEAT TREAT METALS WITH OXYACETYLENE EQUIPMENT | 73 |
| F219 PARTICIPATE IN DESIGN OF PARTS TO BE FABRICATED | 71 |
| Q650 WELD REPAIR CRACKS IN AIRCRAFT JET ENGINE EXHAUST SYSTEMS | 70 |
| L422 BRAZE STEEL CASTINGS WITH OXYACETYLENE EQUIPMENT | 69 |
| J377 HARDEN FERROUS METALS | 66 |
| R657 FABRICATE METAL WORK STANDS OR FURNITURE | 65 |
| F221 RESEARCH TECHNICAL PUBLICATIONS FOR SETUP OR WELDING OPERATIONS | 64 |
| J394 STRESS RELIEVE FERROUS METALS | 60 |
| J371 ANNEAL FERROUS METALS | 60 |
| Q609 FILLET WELD REPAIR AIRCRAFT JET ENGINE COMPONENTS, SUCH AS LINERS OR NOZZLES | 58 |
| R654 FABRICATE AIRCRAFT RELATED SUPPORT EQUIPMENT, SUCH AS TRAILERS OR STORAGE RACKS | 56 |
| M472 WELD MAGNESIUM OR MAGNESIUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 54 |

TABLE IB

GROUP ID NUMBER AND TITLE: GRP054 - AGE and Local Manufacture Welders

GROUP SIZE: 34 PERCENT OF SAMPLE: 7%

AVERAGE GRADE: E-3, E-4 AVERAGE TICF: 37 MONTHS

AVERAGE TAFMS: 57 MONTHS

The following are in descending order by percent members performing:

| TASKS | PERCENT MEMBERS PERFORMING |
|---|---|
| F257 SET UP WELDING MACHINE | 100 |
| I359 CLEAN METALS USING WIRE WHEELS | 97 |
| M471 WELD LOW OR MEDIUM CARBON STEELS WITH TIG EQUIPMENT | 97 |
| S677 WELD REPAIR POWERED OR NONPOWERED AEROSPACE GROUND EQUIPMENT (AGE) | 88 |
| I363 GRIND METAL SURFACES | 88 |
| L426 CUT LOW, MEDIUM, OR HIGH CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 88 |
| L437 SILVER SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 88 |
| F239 SET UP FOR PORTABLE WELDING OPERATIONS | 85 |
| G301 REMOVE OR REPLACE GAS REGULATORS ON TIG WELDING EQUIPMENT | 85 |
| 0551 ARC WELD LOW OR MEDIUM CARBON STEELS, OTHER THAN JOINTS | 82 |
| I357 CLEAN METALS USING OXYACETYLENE WELDING EQUIPMENT | 79 |
| L445 WELD LOW OR MEDIUM CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 79 |
| H348 VISUALLY INSPECT WELDS FOR DEFECTS | 76 |
| G274 PERFORM OPERATOR MAINTENANCE ON ARC WELDING EQUIPMENT | 76 |
| M459 WELD HEAT AND CORROSION RESISTANT STAINLESS STEEL BUTT JOINTS WITH TIG EQUIPMENT | 74 |
| H338 PERFORM HARDNESS TESTS USING STATIONARY EQUIPMENT | 68 |
| E182 MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 65 |
| S685 WELD REPAIR TOOL BOXES | 65 |
| F241 SET UP FOR SHAPING USING HEAT-WORKING METHOD | 65 |
| G292 PERFORM OPERATOR MAINTENANCE ON STATIONARY TIG EQUIPMENT | 65 |
| F248 SET UP FOR WELDING PIPE JOINTS | 65 |
| F219 PARTICIPATE IN DESIGN OF PARTS TO BE FABRICATED | 62 |
| 0554 CONSTRUCT FILLET WELDS ON LOW OR MEDIUM CARBON STEELS USING ARC WELDING EQUIPMENT | 59 |
| H346 VISUALLY EXAMINE METALS FOR IDENTIFICATION | 59 |
| S676 WELD REPAIR FURNITURE | 59 |
| M490 WELD 4130 LOW ALLOY STEEL BUTT JOINTS WITH TIG EQUIPMENT | 59 |
| M460 WELD HEAT AND CORROSION RESISTANT STAINLESS STEEL TEE JOINTS WITH TIG EQUIPMENT | 56 |
| R654 FABRICATE AIRCRAFT RELATED SUPPORT EQUIPMENT, SUCH AS TRAILERS OR STORAGE RACKS | 53 |
| R657 FABRICATE METAL WORK STANDS OR FURNITURE | 53 |
| M454 WELD ALUMINUM OR ALUMINUM ALLOY TUBE AND SHEET JOINTS WITH TIG EQUIPMENT | 53 |
| R662 FORGE METALS TO SHAPE USING BLACKSMITH TOOLS (HEAT SOURCE) | 53 |
| L422 BRAZE STEEL CASTINGS WITH OXYACETYLENE EQUIPMENT | 53 |

TABLE IC

GROUP ID NUMBER AND TITLE: GRP045 - First-Line Supervisors

GROUP SIZE: 121 PERCENT OF SAMPLE: 26%

AVERAGE GRADE: E-5 AVERAGE TICF: 110 MONTHS

AVERAGE TAFMS: 129 MONTHS

The following are in descending order by percent members performing:

| TASKS | PERCENT MEMBERS PERFORMING |
|---|---|
| F257 SET UP WELDING MACHINE | 98 |
| M459 WELD HEAT AND CORROSION RESISTANT STAINLESS STEEL BUTT JOINTS WITH TIG EQUIPMENT | 98 |
| M455 WELD ALUMINUM OR ALUMINUM ALLOYS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 98 |
| M471 WELD LOW OR MEDIUM CARBON STEELS WITH TIG EQUIPMENT | 98 |
| I363 GRIND METAL SURFACES | 97 |
| L437 SILVER SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 95 |
| G292 PERFORM OPERATOR MAINTENANCE ON STATIONARY TIG EQUIPMENT | 95 |
| S677 WELD REPAIR POWERED OR NONPOWERED AEROSPACE GROUND EQUIPMENT (AGE) | 94 |
| A3 COORDINATE METAL PROCESSING SHOP ACTIVITIES WITH OTHER SHOPS | 94 |
| M458 WELD HASTELLOY METALS WITH TIG EQUIPMENT | 94 |
| E182 MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 93 |
| A5 DETERMINE WORK PRIORITIES | 93 |
| E161 IDENTIFY SERVICEABLE OR NONSERVICEABLE TOOLS OR EQUIPMENT | 93 |
| H338 PERFORM HARDNESS TESTS USING STATIONARY EQUIPMENT | 90 |
| E187 MAKE ENTRIES ON DD FORMS 1574 (SERVICEABLE TAG-MATERIEL) | 90 |
| L434 LEAD SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 90 |
| A15 PLAN OR SCHEDULE WORK ASSIGNMENTS AND PRIORITIES | 88 |
| H346 VISUALLY EXAMINE METALS FOR IDENTIFICATION | 88 |
| C97 WRITE APRs | 83 |
| B28 COUNSEL PERSONNEL ON PERSONAL OR MILITARY-RELATED MATTERS | 81 |
| M450 WELD A-286 TEE JOINTS WITH TIG EQUIPMENT | 81 |
| L422 BRAZE STEEL CASTINGS WITH OXYACETYLENE EQUIPMENT | 81 |
| F218 MAKE TEMPLATES | 80 |
| B48 INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES | 79 |
| B59 SUPERVISE METALS PROCESSING SPECIALISTS (AFSC 42754) | 76 |
| D105 CONDUCT OJT | 75 |
| R654 FABRICATE AIRCRAFT RELATED SUPPORT EQUIPMENT, SUCH AS TRAILERS OR STORAGE RACKS | 74 |
| M472 WELD MAGNESIUM OR MAGNESIUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 74 |
| E194 PREPARE LETTERS OF JUSTIFICATION FOR SUPPLY-RELATED MATTERS | 73 |
| D110 CONDUCT TRAINING FOR QUALIFICATION OR CERTIFICATION | 70 |
| Q610 INSPECT AIRCRAFT JET ENGINE PARTS FOR DAMAGE | 69 |

TABLE ID

GROUP ID NUMBER AND TITLE: GRP052 - Support Equipment Welding Supervisors

GROUP SIZE: 12 PERCENT OF SAMPLE: 3%

AVERAGE GRADE: E-5, E-6 AVERAGE TICF: 131 MONTHS

AVERAGE TAFMS: 158 MONTHS

The following are in descending order by percent members performing:

| TASKS | PERCENT MEMBERS PERFORMING |
|---|---|
| E182 MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 100 |
| B59 SUPERVISE METALS PROCESSING SPECIALISTS (AFSC 42754) | 100 |
| E190 ORDER MATERIALS OR SUPPLIES | 100 |
| A3 COORDINATE METAL PROCESSING SHOP ACTIVITIES WITH OTHER SHOPS | 100 |
| A10 ESTABLISH IN-SHOP PRODUCTION CONTROLS | 100 |
| C97 WRITE APRs | 100 |
| M452 WELD ALUMINUM OR ALUMINUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 100 |
| S677 WELD REPAIR POWERED OR NONPOWERED AEROSPACE GROUND EQUIPMENT (AGE) | 92 |
| I363 GRIND METAL SURFACES | 92 |
| M459 WELD HEAT AND CORROSION RESISTANT STAINLESS STEEL BUTT JOINTS WITH TIG EQUIPMENT | 92 |
| E153 COMPLETE AF FORMS 2005 (ISSUE/TURN IN REQUEST) | 83 |
| F237 SET UP FOR METAL CUTTING USING MANUAL EQUIPMENT | 83 |
| L426 CUT LOW, MEDIUM, OR HIGH CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 83 |
| L437 SILVER SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 83 |
| I352 CLEAN METALS BY BLASTING | 75 |
| E179 MAINTAIN SUPPLY RECORDS | 75 |
| H348 VISUALLY INSPECT WELDS FOR DEFECTS | 75 |
| E169 MAINTAIN CORRESPONDENCE FILES | 75 |
| G292 PERFORM OPERATOR MAINTENANCE ON STATIONARY TIG EQUIPMENT | 75 |
| O551 ARC WELD LOW OR MEDIUM CARBON STEELS, OTHER THAN JOINTS | 75 |
| M471 WELD LOW OR MEDIUM CARBON STEELS WITH TIG EQUIPMENT | 75 |
| S685 WELD REPAIR TOOL BOXES | 67 |
| A22 SCHEDULE LEAVES OR PASSES | 67 |
| H330 IDENTIFY METALS USING MILITARY SPECIFICATIONS | 58 |
| C88 INSPECT CERTIFICATION TEST PLATES | 58 |
| E199 PROCESS RECLAMATION OR SALVAGE OF SCRAP MATERIALS | 58 |
| C85 EVALUATE WORK COMPLETED OR IN-PROGRESS FOR COMPLIANCE WITH SPECIFICATIONS OR STANDARDS | 50 |
| R657 FABRICATE METAL WORK STANDS OR FURNITURE | 50 |
| J378 HARDEN NONFERROUS METALS | 50 |
| E174 MAINTAIN MAN-HOUR ACCOUNTING RECORDS | 50 |
| B35 DIRECT MAINTENANCE OR UTILIZATION OF EQUIPMENT | 50 |
| M458 WELD HASTELLOY METALS WITH TIG EQUIPMENT | 50 |
| L445 WELD LOW OR MEDIUM CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 50 |

TABLE IE

GROUP ID NUMBER AND TITLE: GRP037 - Jet Engine Welders

GROUP SIZE: 8 PERCENT OF SAMPLE: 2%

AVERAGE GRADE: E-3 AVERAGE TICF: 33 MONTHS

AVERAGE TAFMS: 43 MONTHS

The following are in descending order by percent members performing:

| TASKS | PERCENT MEMBERS PERFORMING |
|---|---|
| Q650 WELD REPAIR CRACKS IN AIRCRAFT JET ENGINE EXHAUST SYSTEMS | 100 |
| S677 WELD REPAIR POWERED OR NONPOWERED AEROSPACE GROUND EQUIPMENT (AGE) | 100 |
| M458 WELD HASTELLOY METALS WITH TIG EQUIPMENT | 100 |
| Q647 WELD REPAIR AIRCRAFT JET ENGINE TURBINE SECTION COMPONENTS | 100 |
| I359 CLEAN METALS USING WIRE WHEELS | 100 |
| F242 SET UP FOR SILVER SOLDERING | 100 |
| M447 ADJUST WATERFLOW, GAS FLOW, OR AMPERAGE WHEN WELDING WITH TUNGSTEN INERT GAS (TIG) EQUIPMENT | |
| Q644 WELD REPAIR AIRCRAFT JET ENGINE COMBUSTION SECTION COMPONENTS, SUCH AS FLAMEHOLDERS | 88 |
| H348 VISUALLY INSPECT WELDS FOR DEFECTS | 88 |
| I352 CLEAN METALS BY BLASTING | 88 |
| L426 CUT LOW, MEDIUM, OR HIGH CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 88 |
| L438 SILVER SOLDER NONFERROUS METALS WITH OXYACETYLENE EQUIPMENT | 88 |
| F257 SET UP WELDING MACHINE | 88 |
| F237 SET UP FOR METAL CUTTING USING MANUAL EQUIPMENT | 88 |
| M452 WELD ALUMINUM OR ALUMINUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 88 |
| F254 SET UP STATIONARY HARDNESS TESTING EQUIPMENT | 88 |
| E182 MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 75 |
| M449 WELD A-286 METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 75 |
| H338 PERFORM HARDNESS TESTS USING STATIONARY EQUIPMENT | 75 |
| Q609 FILLET WELD REPAIR AIRCRAFT JET ENGINE COMPONENTS, SUCH AS LINERS OR NOZZLES | 63 |
| M491 WELD 4130 LOW ALLOY STEEL METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 63 |
| L434 LEAD SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 63 |
| 0551 ARC WELD LOW OR MEDIUM CARBON STEELS, OTHER THAN JOINTS | 50 |
| Q631 SMOOTH NICKS, SCRATCHES, OR DENTS IN AIRCRAFT JET ENGINE COMPONENTS | 50 |
| Q645 WELD REPAIR AIRCRAFT JET ENGINE COMPRESSOR SECTION COMPONENTS | 50 |
| H346 VISUALLY EXAMINE METALS FOR IDENTIFICATION | 50 |
| Q626 RESHAPE AIRCRAFT JET ENGINE COMPONENTS | 50 |
| M467 WELD INCONEL METALS, OTHER THAN JOINTS, WITH TIG EQUIPMENT | 50 |
| G292 PERFORM OPERATOR MAINTENANCE ON STATIONARY TIG EQUIPMENT | 50 |
| J377 HARDEN FERROUS METALS | 50 |

TABLE IF

GROUP ID NUMBER AND TITLE: GRP025 - Welding Trainees

GROUP SIZE: 12 PERCENT OF SAMPLE: 3%

AVERAGE GRADE: E-2, E-3 AVERAGE TICF: 17 MONTHS

AVERAGE TAFMS: 23 MONTHS

The following are in descending order by percent members performing:

| TASKS | PERCENT MEMBERS PERFORMING |
|---|---|
| I363 GRIND METAL SURFACES | 100 |
| F257 SET UP WELDING MACHINE | 100 |
| F244 SET UP FOR WELDING BUTT JOINTS | 100 |
| G258 CHANGE GAS CYLINDERS | 100 |
| G261 CLEAN OR STORE HAND TOOLS | 92 |
| G260 CLEAN MACHINES | 92 |
| I362 FILE METAL SURFACES | 92 |
| F256 SET UP WELDING FIXTURES OR ATTACHMENTS | 92 |
| F239 SET UP FOR PORTABLE WELDING OPERATIONS | 83 |
| F249 SET UP FOR WELDING STRINGER BEADS | 83 |
| F237 SET UP FOR METAL CUTTING USING MANUAL EQUIPMENT | 83 |
| L426 CUT LOW, MEDIUM, OR HIGH CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 83 |
| I357 CLEAN METALS USING OXYACETYLENE WELDING EQUIPMENT | 83 |
| F246 SET UP FOR WELDING FILLET JOINTS | 75 |
| L437 SILVER SOLDER FERROUS METALS WITH OXYACETYLENE EQUIPMENT | 75 |
| G262 CLEAN OR STORE WELDING MACHINE FIXTURES OR ATTACHMENTS | 75 |
| S677 WELD REPAIR POWERED OR NONPOWERED AEROSPACE GROUND EQUIPMENT (AGE) | 67 |
| 0551 ARC WELD LOW OR MEDIUM CARBON STEELS, OTHER THAN JOINTS | 67 |
| I352 CLEAN METALS BY BLASTING | 67 |
| G265 INSPECT CONDITION OF HAND TOOLS | 67 |
| G263 CLEAN, SCRAPE, OR PAINT WORK TABLES | 67 |
| L436 PREHEAT METALS WITH OXYACETYLENE EQUIPMENT | 67 |
| G274 PERFORM OPERATOR MAINTENANCE ON ARC WELDING EQUIPMENT | 67 |
| G268 LUBRICATE HAND TOOLS | 67 |
| F241 SET UP FOR SHAPING USING HEAT-WORKING METHOD | 67 |
| I350 CHIP METAL SURFACES USING HAND TOOLS | 58 |
| 0554 CONSTRUCT FILLET WELDS ON LOW OR MEDIUM CARBON STEELS USING ARC WELDING EQUIPMENT | 58 |
| G286 PERFORM OPERATOR MAINTENANCE ON PORTABLE OXYACETYLENE EQUIPMENT | 58 |
| M452 WELD ALUMINUM OR ALUMINUM ALLOY BUTT JOINTS WITH TIG EQUIPMENT | 58 |
| E182 MAKE ENTRIES ON AFTO FORMS 349 (MAINTENANCE DATA COLLECTION RECORD) | 50 |
| 0549 ARC WELD LOW OR MEDIUM CARBON STEEL BUTT JOINTS | 50 |
| L445 WELD LOW OR MEDIUM CARBON STEELS WITH OXYACETYLENE EQUIPMENT | 50 |
| G264 EMPTY SAND BLASTING EQUIPMENT HOPPERS | 50 |

TABLE II

GROUP ID NUMBER AND TITLE: GRP047 - LARGE SHOP NCOICs

GROUP SIZE: 21 PERCENT OF SAMPLE: 5%

AVERAGE GRADE: E-6 AVERAGE TICF: 145 MONTHS

AVERAGE TAFMS: 166 MONTHS

The following are in descending order by percent members performing:

| TASKS | | PERCENT MEMBERS PERFORMING |
|---|---|---|
| C89 | INSPECT PERSONNEL FOR COMPLIANCE WITH MILITARY STANDARDS | 100 |
| A15 | PLAN OR SCHEDULE WORK ASSIGNMENTS AND PRIORITIES | 100 |
| C93 | PERFORM SAFETY INSPECTIONS OF EQUIPMENT OR FACILITIES | 100 |
| C97 | WRITE APRs | 95 |
| C94 | REVIEW MAINTENANCE DATA COLLECTION FORMS | 95 |
| B29 | DEVELOP OR IMPROVE WORK METHODS OR PROCEDURES | 95 |
| E156 | COORDINATE WITH BASE SUPPLY ON OBTAINING PARTS | 90 |
| B48 | INTERPRET POLICIES, DIRECTIVES, OR PROCEDURES FOR SUBORDINATES | 90 |
| E154 | COMPLETE WORK REQUESTS FOR METAL PROCESSING PROJECTS | 90 |
| C87 | INDORSE AIRMAN PERFORMANCE REPORTS (APR) | 90 |
| B35 | DIRECT MAINTENANCE OR UTILIZATION OF EQUIPMENT | 90 |
| A10 | ESTABLISH IN-SHOP PRODUCTION CONTROLS | 90 |
| E153 | COMPLETE AF FORMS 2005 (ISSUE/TURN IN REQUEST) | 90 |
| E209 | SCHEDULE PERSONNEL FOR CERTIFICATION OR RECERTIFICATION | 90 |
| E189 | MAKE ENTRIES ON DD FORMS 1577-2 (UNSERVICEABLE/REPARABLE TAG MATERIEL) | 90 |
| E160 | IDENTIFY SERVICEABLE OR NONSERVICEABLE AIRCRAFT COMPONENTS | 86 |
| D115 | DETERMINE OJT TRAINING REQUIREMENTS | 86 |
| A11 | ESTABLISH OR UPDATE ORGANIZATIONAL POLICIES, OFFICE INSTRUCTIONS (OI), OR STANDING OPERATING PROCEDURES (SOP) | 86 |
| C85 | EVALUATE WORK COMPLETED OR IN-PROGRESS FOR COMPLIANCE WITH SPECIFICATIONS OR STANDARDS | 81 |
| C88 | INSPECT CERTIFICATION TEST PLATES | 76 |
| D110 | CONDUCT TRAINING FOR QUALIFICATION OR CERTIFICATION | 76 |
| C64 | ANALYZE WORKLOAD REQUIREMENTS | 76 |
| B60 | SUPERVISE METALS PROCESSING TECHNICIANS (AFSC 42774) | 71 |
| E174 | MAINTAIN MAN-HOUR ACCOUNTING RECORDS | 71 |
| C76 | EVALUATE MAINTENANCE OR PRODUCTION REPORTS | 71 |
| H338 | PERFORM HARDNESS TESTS USING STATIONARY EQUIPMENT | 71 |
| F216 | DETERMINE PROCESSING REQUIREMENTS FROM DRAWINGS, BLUEPRINTS, OR SPECIFICATIONS | 67 |
| E167 | ISSUE SUPPLIES AND EQUIPMENT | 67 |
| E201 | RESEARCH SUPPLY PUBLICATIONS FOR IDENTIFICATION OR PROCUREMENT OF MATERIALS | 67 |
| D105 | CONDUCT OJT | 67 |
| C74 | EVALUATE INSPECTION REPORTS OR PROCEDURES | 67 |
| E180 | MAINTAIN WORK ORDER FILES | 62 |
| E185 | MAKE ENTRIES ON DD FORMS 1348-1 (SINGLE LINE ITEM RELEASE/ RECEIPT DOCUMENT) | 62 |
| C81 | EVALUATE QUALITY CONTROL PROCEDURES | 57 |

# APPENDIX B

## TABLES DISPLAYING DATA PERTAINING TO SPECIFIC BACKGROUND QUESTIONS

TABLE B1

APPROXIMATE PERCENTAGE OF TOTAL JOB TIME SPENT
PERFORMING WELDING TASKS RELATING TO LOCAL MANUFACTURE OF ITEMS
(SUCH AS WORK STANDS, JACKS, COVERS, OR WHEELED TRAILERS)
(PERCENT MEMBERS RESPONDING)

| | MAJCOM | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PERCENTAGE OF TOTAL JOB TIME | TAC (N=144) | SAC (N=106) | MAC (N=53) | USAFE (N=50) | ATC (N=48) | PACAF (N=26) | AFSC (N=19) | AAC (N=10) |
| NONE | 0 | 1 | 4 | 0 | 17 | 0 | 5 | 0 |
| LESS THAN 10% | 9 | 1 | 2 | 6 | 27 | 15 | 26 | 0 |
| 10 - 19% | 6 | 3 | 4 | 4 | 10 | 4 | 0 | 0 |
| 20 - 29% | 8 | 7 | 0 | 16 | 4 | 12 | 5 | 20 |
| 30 - 39% | 10 | 9 | 8 | 8 | 13 | 12 | 0 | 10 |
| 40 - 49% | 14 | 12 | 15 | 14 | 13 | 15 | 11 | 0 |
| 50 - 59% | 17 | 9 | 15 | 6 | 6 | 4 | 0 | 10 |
| 60 - 69% | 8 | 14 | 11 | 10 | 0 | 4 | 16 | 20 |
| 70% OR BETTER | 16 | 32 | 19 | 16 | 2 | 19 | 11 | 30 |

NOTE: Percentages may not add to 100 percent due to nonresponses or rounding

TABLE B2

PERSONNEL PERFORMING CALIBRATION OF SHOP HEAT TREATING FURNACES
(PERCENT MEMBERS RESPONDING)

| PERSONNEL PERFORMING CALIBRATION | MAJCOM | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | TAC (N=144) | SAC (N=106) | MAC (N=53) | USAFE (N=50) | ATC (N=48) | PACAF (N=26) | AFSC (N=19) | AAC (N=10) |
| NO FURNACES IN MY SHOP | 19 | 9 | 4 | 16 | 8 | 4 | 21 | 20 |
| WELDING SHOP PERSONNEL | 7 | 7 | 11 | 8 | 15 | 4 | 11 | 0 |
| PMEL PERSONNEL | 67 | 76 | 72 | 62 | 63 | 89 | 32 | 70 |
| CONTRACT PERSONNEL | 9 | 9 | 17 | 10 | 0 | 8 | 32 | 0 |
| CIVIL ENGINEERING PERSONNEL | 1 | 1 | 2 | 0 | 2 | 4 | 0 | 0 |
| OTHER | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 |

NOTE: Percentages may not equal 100 percent due to nonresponses, rounding, or multiple responses

TABLE B3

PARTICIPATION IN SHOP NOISE LEVEL INSPECTIONS
(PERCENT MEMBERS RESPONDING)

| AVERAGE NUMBER TIMES PARTICIPATED IN LAST YEAR | 1ST JOB (N=85) | 1ST ENL (N=161) | DAFSC 42754 (N=264) | DAFSC 42774 (N=135) | TOTAL SAMPLE (N=459) |
|---|---|---|---|---|---|
| NONE | 55 | 44 | 37 | 24 | 37 |
| ONCE EVERY MONTH | 0 | 1 | 1 | 0 | 1 |
| ONCE EVERY 3 MONTHS | 1 | 3 | 3 | 4 | 3 |
| ONCE EVERY 6 MONTHS | 7 | 12 | 12 | 13 | 11 |
| ONCE EVERY 9 MONTHS | 4 | 3 | 3 | 0 | 2 |
| ONCE EVERY YEAR | 25 | 32 | 34 | 42 | 36 |
| OTHER | 0 | 0 | * | 0 | * |

* Denotes less than .5 percent

NOTE: Percentages may not equal 100 percent due to nonresponses, rounding, or multiple responses

TABLE B4

PARTICIPATION IN SHOP LIGHTING INSPECTIONS
(PERCENT MEMBERS RESPONDING)

| AVERAGE NUMBER TIMES PARTICIPATED IN LAST YEAR | 1ST JOB (N=85) | 1ST ENL (N=161) | DAFSC 42754 (N=264) | DAFSC 42774 (N=135) | TOTAL SAMPLE (N=459) |
|---|---|---|---|---|---|
| NONE | 75 | 67 | 59 | 35 | 55 |
| ONCE EVERY MONTH | 2 | 2 | 2 | 2 | 2 |
| ONCE EVERY 3 MONTHS | 2 | 3 | 2 | 2 | 2 |
| ONCE EVERY 6 MONTHS | 5 | 9 | 11 | 10 | 10 |
| ONCE EVERY 9 MONTHS | 0 | 0 | 2 | 0 | 1 |
| ONCE EVERY YEAR | 7 | 12 | 18 | 34 | 21 |
| OTHER | 1 | 1 | 1 | 0 | 1 |

NOTE: Percentages may not equal 100 percent due to nonresponses or rounding

TABLE B5

PARTICIPATION IN SHOP VENTILATION INSPECTIONS
(PERCENT MEMBERS RESPONDING)

| AVERAGE NUMBER TIMES PARTICIPATED IN LAST YEAR | 1ST JOB (N=85) | 1ST ENL (N=161) | DAFSC 42754 (N=264) | DAFSC 42774 (N=135) | TOTAL SAMPLE (N=459) |
|---|---|---|---|---|---|
| NONE | 48 | 40 | 36 | 19 | 34 |
| ONCE EVERY MONTH | 5 | 3 | 3 | 1 | 2 |
| ONCE EVERY 3 MONTHS | 4 | 3 | 5 | 7 | 5 |
| ONCE EVERY 6 MONTHS | 19 | 21 | 17 | 18 | 17 |
| ONCE EVERY 9 MONTHS | 1 | 1 | 1 | 2 | 1 |
| ONCE EVERY YEAR | 17 | 25 | 30 | 34 | 29 |
| OTHER | 0 | 0 | 0 | 0 | 0 |

NOTE: Percentages may not equal 100 percent due to nonresponses or rounding

TABLE B6

PERSONNEL DRIVING OR OPERATING GOVERNMENT VEHICLES
(PERCENT RESPONDING YES)

| QUESTION | 1ST JOB (N=85) | 1ST ENL (N=161) | DAFSC 42754 (N=264) | DAFSC 42774 (N=135) | TOTAL SAMPLE (N=459) |
|---|---|---|---|---|---|
| DO ANY OF THE DUTIES OF YOUR PRESENT JOB REQUIRE YOU TO DRIVE OR OPERATE GOVERNMENT MOTOR VEHICLES? (YES OR NO) | 34 | 44 | 52 | 74 | 57 |

TABLE B7

LOCATION WHERE METALS PROCESSING ACTIVITIES PERFORMED
(PERCENT RESPONDING YES)

| QUESTION | 1ST JOB (N=85) | 1ST ENL (N=161) | DAFSC 42754 (N=264) | DAFSC 42774 (N=135) | TOTAL SAMPLE (N=459) |
|---|---|---|---|---|---|
| DO YOU PERFORM METALS PROCESSING ACTIVITIES OUTSIDE THE METALS PROCESSING SHOP BUT NOT IN A FLIGHTLINE ENVIRONMENT? (YES OR NO) | 53 | 62 | 68 | 64 | 64 |

END

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